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In This Issue

The Erie Installs Retarders in Marion YardPage 706

Tells how this road, by installing car retarders in its westbound classification yard at Marion, Ohio, has increased the capacity of the yard and reduced its operating costs approximately 40 cents per car handled.

Missouri Pacific Completes Important Double Track 711

A description of double tracking between St. Louis, Mo., and Jefferson City, 125 miles, which is being carried out by this company under a five-year schedule.

Unique Operating Conditions Met 717

A resumé of methods employed by the Bangor & Aroostook in maintaining an operating ratio as low as 63 per cent, in the face of light traffic and unusually severe winter conditions.

EDITORIALS

Industrial Traffic Managers and the Railways	703
British Commission Reports on Transport	704
Car Loadings and Business	705
Reducing Expenses Quickly by Signaling	705

GENERAL ARTICLES

The Erie Installs Retarders in Marion Yard	706
Handling Train Supplies on the Southern Pacific	708
Double-End Gas-Electric Wrecking Crane	710
Missouri Pacific Completes Important Double Track	711
Freight Car Loading	716
Unique Operating Conditions Met	717
New Santa Fe Horse Express Cars	720

COMMUNICATIONS AND BOOKS 723

LOOKING BACKWARD 725

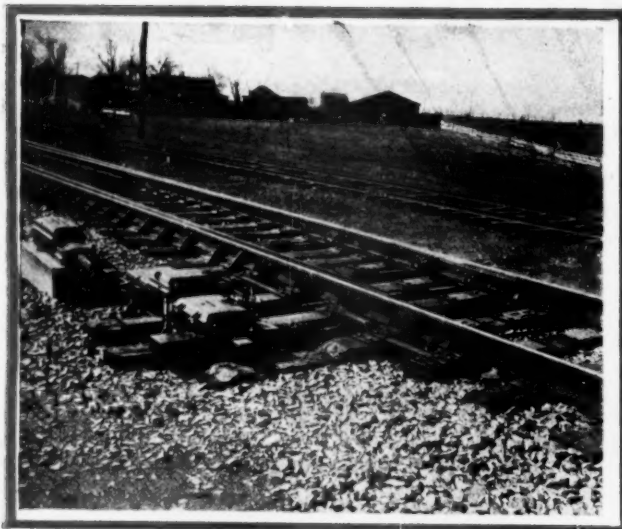
ODDS AND ENDS 726

NEWS 727

ANNUAL REPORTS

Central of Georgia Railway Company	745
Delaware, Lackawanna & Western Railroad Company	747

The Railway Age is indexed by the Industrial Arts Index and also by the
Engineering Index Service

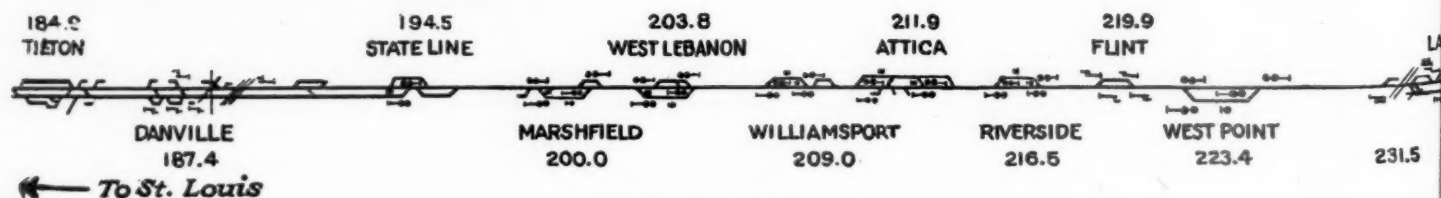


And, 93 miles away, the switch moved at the end of double track at State Line, Indiana



Above—Looking east toward end of double track at State Line, Indiana.

Below—Looking east at west end of Marshfield.



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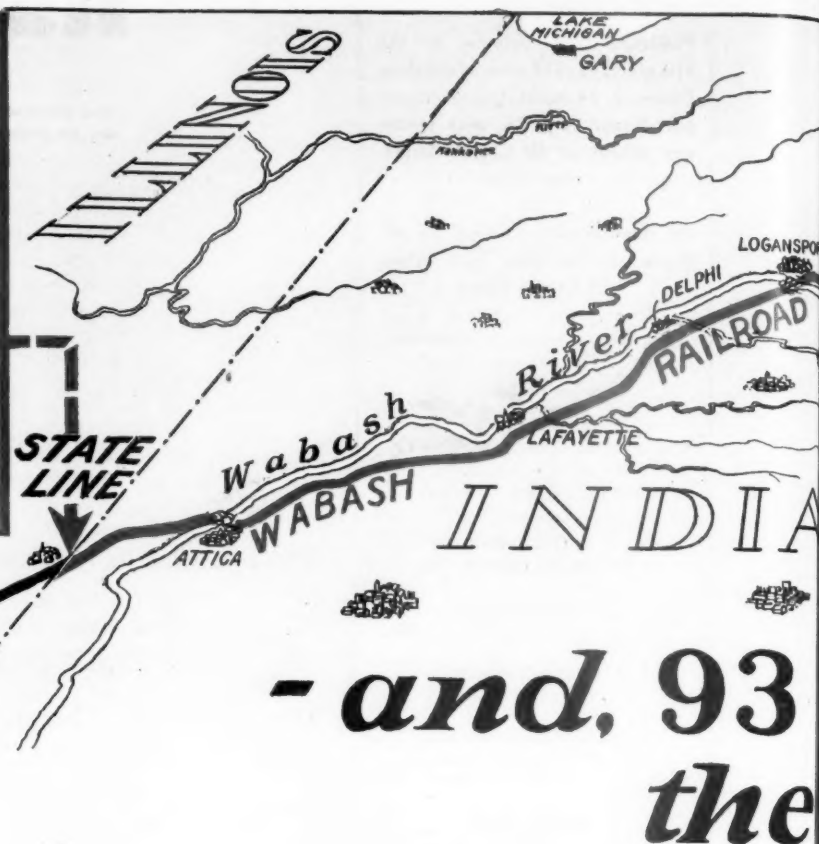
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"STATE LINE switch tested O. K. and in service 11:20 today (February 4, 1931). Believe first instance of switch operated 93 miles from control point."

And, 93 miles away, the switch moved at the end of double track as the dispatcher made his lineup for the first time. This placed in service the first switch to be operated by "Union" Centralized Traffic Control on the Wabash installation extending over the Peru division between Peru, Ind. and Tilton, Ill. Nowhere in the world is there a power-operated switch further removed from its control machine. The distance between control machine and operated function is two-thirds the width of the state of Indiana.

Instead of hearing the whistles of locomotives, the grinding of brakes and the passing of trains, the dispatcher hears nothing more exciting than the honk of automobile horns and the rattle of trucks, because the centralized traffic control machine in the dispatcher's office at Peru is located in the center of the business section and about a mile from the railroad tracks. But before him are visual, audible and written indications giving him an accurate picture and permanent record of every train moving over the territory.

Industrial Traffic Managers and the Railways

Most large shippers and chambers of commerce have traffic managers. These "industrial traffic managers," as they are usually called, formerly dealt principally with the traffic departments of the railways. Since the organization of the Regional Shippers' Advisory Boards they have come more closely into contact with railway operating departments. Because it is their function to get both fair rates and satisfactory transportation service for industry and commerce, they should be at all times especially well-informed regarding transportation problems and the best means of solving them. As the railroads still are, and for many years at least will continue to be, the nation's most important means of transportation, there can be no fundamental conflict of interest between industry and commerce, on the one hand, and the railroads, on the other; and only traffic managers who help industry and commerce to get good transportation service as well as reasonable rates can be useful to them.

An editorial published in the *Railway Age* of April 4 described briefly the plan that has been adopted by the Birmingham (Ala.) Traffic and Transportation Club to "clear the track for better business." The officers of the club, under whose leadership this plan has been adopted, are almost all industrial traffic managers. Their plan is, in brief, to help business by helping to solve the new and important problems of the railroad industry.

Petty Criticism of the Railways

There is a striking difference between their attitude and that of most industrial traffic managers in other parts of the country. Nobody knows better than industrial traffic managers the great improvement that has been made in railway freight service within the last decade, and its value to industry and commerce. They should know that, without adequate earnings, the railways cannot maintain this service; that the earnings of the railways recently have been the worst that they have been for many years; and that their future earning capacity is being seriously threatened by the combination of regulation and subsidized and unregulated competition to which they are being subjected.

Nevertheless, most industrial traffic managers are assuming an attitude of antagonism toward the policies advocated by the railways as means of getting equal treatment and equal opportunity for all means of transportation. The National Industrial Traffic League, as its name implies, is composed of industrial traffic managers. C. E. Childe, of the Omaha Chamber of Commerce, appeared on behalf of the National Industrial Traffic League in recent hearings before the Interstate Commerce Commission, and therefore must be assumed to have expressed the views of most members of the League. He opposed any regulation of truck traffic, saying there is no demand by shippers for such regulation and that this class of carrier furnishes a service not comparable to any other form of transportation. W. H. Chandler, traffic manager of the Merchants Association of New York, appearing in the same hearings on behalf of the Shippers' Conference of Greater New York and the Chain Store Traffic League of New York, criticized the railways for their "misleading propaganda" for "strangulatory" regulation of other means of transportation. He said "the railroads seem to think that the public is morally obliged to support them and to pay higher charges for inferior service," and criticized them for failing to engage in truck transportation and in furnishing store door delivery.

The testimony of these witnesses reflected no credit on the fairness, intelligence and vision of industrial traffic managers. On the contrary, it indicated that they and those for whom they spoke are blind to the significance of the revolution in transportation conditions that has occurred within the last decade. Mr. Chandler knows that the railways are advocating only such "strangulatory" regulation of other means of transportation as is applied to themselves. He should know that, whatever the public may or may not be "morally obliged" to do, it is economically obliged to support the railways if it is to have railway service, and that for the public to subsidize unregulated competition with them tends to force the railways to charge the higher rates for inferior service of which he complained. Such supercilious criticism of railway management as he in-

dulged in does not sound well when it comes from men who have never done anything that indicates they are especially qualified to tell how the railways should be managed; and yet similar criticism is often heard from industrial traffic managers. This is especially true of some who represent, not industries, but commercial organizations, and who therefore cannot be held directly responsible by their employers if they fail to get good transportation service. Many of these traffic representatives of commercial organizations have never had any real business or transportation experience, and they might well be advised to "get a reputation" before they presume to discuss with so much assurance conditions and problems of which they seem to know so little.

Has Experience Taught Nothing?

The attitude and utterances of many industrial traffic managers suggest that they are still obsessed with the belief that almost the sole objective of shippers should be to get the lowest possible rates, regardless of whether they are secured largely at the cost of the tax-paying public or not, and regardless of the probable effects on railway service. It does seem that they should have learned more from the nation's experience with both car shortages and good and adequate railway service during the last twenty years. The transportation problem of the United States is something very much larger than a difference of a few cents or even a few dollars in any shipper's freight bill. Transportation conditions at present are a chaos. Not only are the present earnings of the railroads among the worst in history, but their prospects are far from good. If railroad earning capacity is not restored investors will suffer large losses, and if railroad service deteriorates industry and commerce will suffer still larger losses. The traffic managers of industry and commerce are employed to get good service as well as reasonable rates. Therefore they should be foremost in offering constructive suggestions for the solution of the great problems presented.

The members of the National Industrial Traffic League have an opportunity in the present emergency to do a great constructive work, but most of them are doing nothing to take advantage of that opportunity, but, on the contrary, are devoting their energies to petty criticism of railway management and to defending conditions and policies that are tending to destroy railway earning capacity and ruin railway service. The industry and commerce of the country needs to be better represented by those who speak for it regarding transportation problems. Most industrial traffic managers could well profit by the example being set by those of Birmingham. They should shake off the prejudices they have acquired in trying for years to screw out of the railways a differential of a few cents in freight rates, read the reports of railway earnings as they are being published by the Interstate Commerce Commission, consider the disaster toward which these figures plainly show the railroads are heading, and present the

significant and startling facts regarding the transportation situation to the leaders of commerce and industry. They will not help commerce and industry by continuing their efforts to destroy railway earning capacity and break down railway service.

British Commission Reports on Transport

In the *Railway Age* of March 14, page 543, there appeared a review of the final report of the British Royal Commission on Transport. Although entitled "The Co-ordination and Development of Transport," this report reaches no very definite conclusions nor does it make any specific recommendation on that subject. It suggests merely the creation of an advisory council which would assist Great Britain's minister of transport on co-ordination problems. On other subjects, however, the findings of the commission are more specific and thus several of its recommendations are of special interest in the United States, where the problem of assigning each agency of transport to its proper economic sphere also awaits solution.

The report comments on several agencies of transport such as rail, highway and waterway but, because of the prevalence of problems in connection with rapid developments therein, it devotes the greatest attention to highway transport. Its recommended limitations on sizes and weights of motor trucks are similar to restrictions advocated by the *Railway Age* for heavy highway vehicles operating in this country. "As a general principle, the use of lighter vehicles should be encouraged . . . and the use of vehicles with an unladen weight in excess of four tons should be discouraged," the commission says, as it discusses its recommendation that "no heavy motor car should be allowed to exceed ten tons in weight unladen." Restricted use of trucks weighing between four and ten tons unladen, it adds, could be effected if at each increase in weight "there should be a substantial increase in the duty payable." Speed restrictions on these heavy vehicles are also recommended for, the report observes, "it is the combination of speed and weight that has such disastrous effects on the carriage-way." It will therefore be seen that the commission in concentrating its attention on the heavy highway vehicle has reached the crux of the problem; it would revise motor taxation to relieve other users of the highway by placing a fair levy on heavy vehicles.

In the section on railroads many interesting conclusions will be found. British railways are told that "the truth of the doctrine that facilities create traffic appears to have been forgotten." It is recommended that if passenger traffic is to be regained by railways restrictions on low-fare tickets must be lifted, since "the public objects to irritating conditions." A general revision and lowering of fares by the railways

would do much toward the recovery of passenger traffic, the report continues. There seems to be much logic in the commission's findings on this point. Bus travel has become synonymous with cheap travel in the United States. If the railways are to participate to any great extent in passenger traffic recruited from persons of limited means, they must dispel the idea that there is much red tape attending a railway journey at reduced rates—the prospective long-haul patron, if assured of equal travel bargains, will no doubt usually select the railway because of its greater speed and comfort. Reductions in passenger rates are now being tried on American railroads. The results should test the commission's conclusion on the point.

The foregoing are the features of the report from the railway point of view. Attention should, however, be called to the concrete results which have already followed upon the findings of this commission. Created in August, 1928, its first report was issued in July, 1929, and its second in October, 1929. Yet but little more than a year later, in this final report, the commission finds itself "gratified to learn that practically all the recommendations which we made in these two reports were, with commendable speed, embodied in the Road Traffic Bill which . . . received Royal assent on August 1, 1930." Thus it will be seen that the British lawmakers, confronted with a practical problem, faced the situation in a practical manner. Possessed of conclusions based on the best available data and the best contemporary thought on the transport problem, they speedily gave statutory force to resulting recommendations. It is a commendable performance, which will no doubt be followed by a similar enactment of the recommendations in this final report. Congress, with its record of procrastination in connection with a similar problem, might profit by the example.

Car Loadings and Business

Measured by railroad car loadings, which are probably the best single measure, the business of the country during the first three months of this year, while very poor, was almost stable. In January, 1930, car loadings were 6.2 per cent less than in January, 1929, and by September the decline had steadily increased to 18.7 per cent. In the last quarter of 1930 they were 16.9 per cent less than in the last quarter of 1929 and 19.8 per cent less than in the last quarter of 1928. No instructive comparisons can be made between 1930 and 1931 because of the prevalence of depression in both years. In the first four weeks of 1931 loadings were 22.4 per cent less than in 1929; in the first eight weeks, 23.1 per cent less, in the first twelve weeks, 23.7 per cent less; and in the thirteenth week, 24.8 per cent less.

The figures given reflect certain significant facts. One of these is that general business steadily grew worse throughout 1930, although optimistic statements that it

was beginning to improve appeared in the press almost daily. Another is that business was worse in the first quarter of 1931 than in any previous part of the depression. Still another fact to which they call attention is that while business was declining throughout 1930, it almost held its own during the first quarter of 1931.

The foregoing facts raise seriously the question whether good or harm has been done by the repeated expression and publication of unfounded opinions that business has been improving. An uninformed person who should go through the files of almost any newspaper for the last eighteen months would gain the impression that business had been steadily improving, and would wonder how, after so much improvement, it could be so bad as news appearing in the same newspapers has shown it has continued to be up to the present. As the optimism expressed was accompanied and followed for more than a year by a constant decline of business, it looks at this late date as if what the nation really needed at the beginning of the depression was a big dose of pessimism. Hope deferred, it is said, maketh the heart sick. Apparently the manufacturing of optimism, when there was no justification for it, delayed the inevitable deepening of the depression and consequently has protracted it.

Reducing Expenses Quickly by Signaling

In these times of reduced traffic there is little on which to base estimates of the benefits of certain improvements unless definite immediate savings in fuel or wages can be shown. On some roads automatic interlockings are being installed to replace plants requiring levermen, effecting annual savings in operating expenses equivalent to 80 to 100 per cent on the expenditure required.

Likewise, under certain circumstances, small interlocking layouts are being controlled remotely from other towers. Some roads have provided remote control for manual block signals at outlying offices, the new system not only providing a means of spacing trains but also giving an automatic OS for the passing of each train, the same as if operators were on duty. In towns where several street crossings are protected by gates or locally-controlled signals, a centralized control of the apparatus is being used by several roads to decided advantage, not only to reduce operating costs but to improve protection afforded.

These are all small projects in terms of the materials and labor involved, but are important in the magnitude of the definite savings that can be accomplished now, also because they are equally effective regardless of the volume of traffic. A large reduction in operating costs in proportion to the whole can be accomplished quickly by pushing such improvements at this time.

The Old Yard
Is at the Left
and the New
at the Right



The Erie Installs Retarders in Marion Yard

Capacity of yard increased and
operating cost reduced

THE Erie has recently completed the installation of car retarders and power switch machines in its reconstructed westbound classification yard at Marion, Ohio. As a result of these improvements, the operating cost of handling cars through the yard has been reduced approximately 40 cents per car, and the capacity of the yard has been increased to such an extent that classification formerly handled at other yards is now being done in Marion.

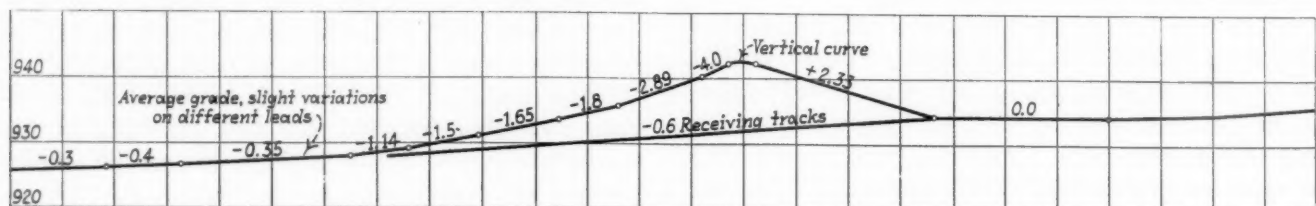
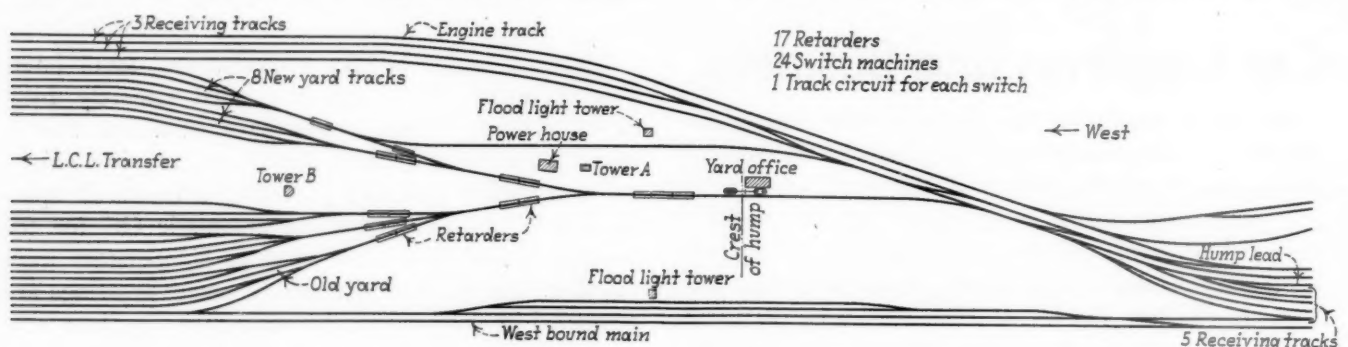
Operating Problems

Marion is located 269 miles east of Chicago on the main line of the Erie from which point a branch line extends 144 miles southwest through Dayton, to Cincin-

nati. The St. Louis, Mo.-Cleveland, Ohio, main line of the Big Four connects with the Erie at Marion and operates jointly with it for 21 miles to Galion, Ohio. Within the limits of the interlocking at Marion Junction, the Erie is also crossed by the Toledo main line of the Chesapeake & Ohio, and the Sandusky-Columbus line of the Pennsylvania.

When coal traffic is moving, the Erie receives from 500 to 600 cars from these connections daily. In addition to this coal, the westbound traffic classified at Marion includes merchandise and manufactured products from the east, and numerous empty refrigerator cars for fruit and meat service.

The westbound classification facilities at Marion were



Plan of Yard Layout Showing Grades

improved in order that complete classifications could be made for connecting lines west of Marion and for the Chicago gateway, as well as for certain industrial districts and freight stations on the Erie in Chicago. Thirty separate classifications are now being made in the new layout with 24 yard tracks. Approximately 3,000 westbound cars can be classified daily, as compared with a maximum of 1,629 cars under the old system of rider operation in vogue a year ago.

Yard Improvements

The old westbound yard included 16 tracks lying in a general east-and-west direction north of the main line. An l.c.l. freight transfer station was located just north of this old yard, and although it is planned to move these facilities elsewhere within the next few years, it was not necessary to do so in order to enlarge the yard, because the eight new tracks were located north of the l.c.l. transfer. Therefore, this arrangement leaves space for 12 additional tracks when the freight transfer is relocated.

The limitations occasioned by the location of the enginehouse and highways did not allow space for the construction of an adequate receiving yard east of the hump.



A Four-Track Group in the New Side of the Yard

Therefore, as a means of getting out of the way a westbound train that arrives when another train is being humped, a three-track receiving yard was constructed alongside and north of the classification yard. This arrangement has occasioned no serious inconvenience.

The new arrangement necessitated that the hump be relocated near the center of the enlarged track layout. New leads were built from the new hump to connect with the 16 tracks in the old yard and the 8 tracks in the new addition. The capacity of the tracks varies from 39 to 125 cars, with a total yard capacity on the classification tracks of 2,000 cars. The natural slope of the ground in this area is westward, and a fill varying from 3 ft. to 13 ft. required approximately 76,000 cu. yd. of clay, with a top dressing of cinders. New 110-lb. rail with treated ties and crushed rock-ballast were used down the hump and throughout the retarders and switches, while 100-lb. relayer rail with gravel ballast were used on the yard tracks.

In designing the grades down the hump and throughout the yard tracks, consideration was given to the fact that many empty cars were to be classified. The climatic conditions and the fact that the prevailing wind is from the southwest also entered into consideration. As shown

on the diagram, the grades on the hump range from 4.0 per cent to 1.65 per cent, gradually reducing to a non-accelerating grade of 0.3 per cent on the tangent yard tracks beyond the switch leads.

The leads in the old yard were arranged on the V-ladder principle, whereas those in the new layout are in five groups of from four to six tracks each. Each group is served by one double retarder, while seven more retarders are located in three groups on the main leads and hump, as shown on the diagram. This grouping of the tracks reduced the number of retarders required to a total of 17, and, in addition, gives quicker separation of cars destined to the different tracks, thus speeding up the operation of the yard.

The 24 classification switches are power-operated, and track circuits and detector locking are employed to prevent a switch from operating under a car. Each track circuit extends a minimum of 20 ft. in the approach to the switch points, and 34 ft. back of the point. The switches, together with the retarders are controlled from two towers, with one operator in Tower A and two in Tower B. Teletype equipment is provided for making switching lists in the yard office and in each of the towers.

The retarders and power switches are of the electro-pneumatic type, and together with the signals, were installed by the Union Switch & Signal Company. The Model-28 car retarder used in this yard provides automatically for car wheels to drop back on the rails if they should inadvertently be pinched out of the retarder.

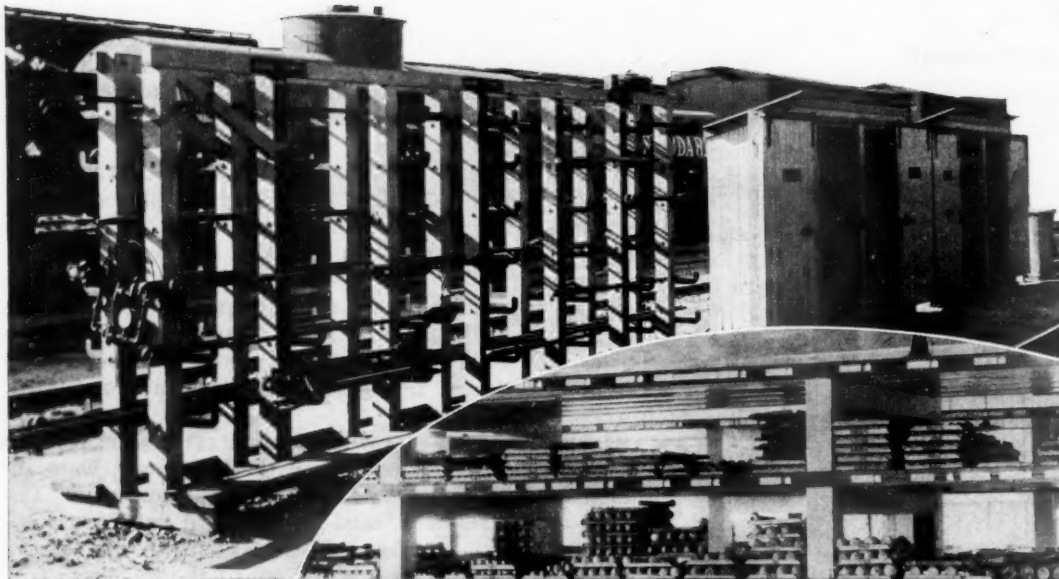
Improvements in Yard Operation

With the operation in the old yard, a crew, consisting of a conductor, 12 riders and 3 switch tenders, was employed to handle 1,200 or more cars daily, the maximum being 1,629 cars. While the yard costs are not separated as between westbound and eastbound yards, the records show that the operating costs were about 94 cents per car a year ago when an average of 2,300 cars were handled daily in both east and westbound yards, which compares favorably with the traffic now being handled. The eastbound yard is operated by yard brakemen and car riders as before, the only improvement in layout or equipment being in the westbound yard. However, certain economies have been accomplished by improved methods of operation in the yard as a whole during the year.

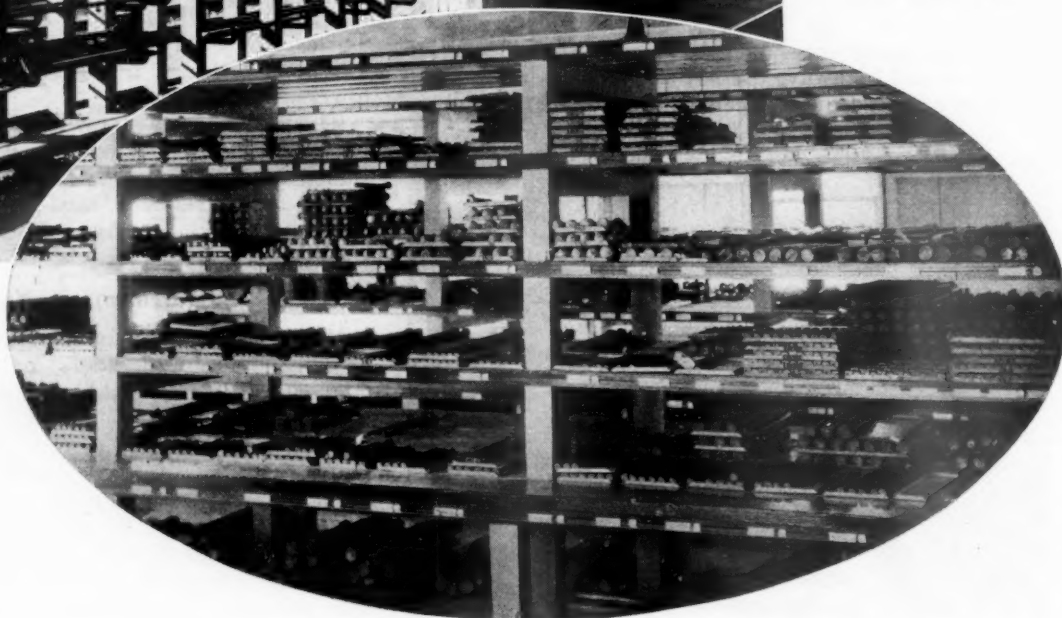
As a result of these improvements in yard layout, equipment, and methods of operation, it has been possible to reduce the number of yard engines required: where 28 daily were required a year ago, the number now ranges from 11 to 18. Additional economies, including the reduced cost of operating the westbound yard, now equipped with retarders, has reduced the average operating cost for yard service from 94 cents a year ago, to 50 cents per car classified in both yards, and operating officers estimate that about 32 cents of the saving per car has been brought about by the new westbound yard layout and retarder equipment.

The yard improvements cost \$597,000, including \$240,000 for the retarders, power switches, signals, compressor equipment, Teletype system, floodlighting layouts, etc. On the basis of the present number of cars handled, an annual saving of approximately \$175,000 is made, which represents a return of approximately 30 per cent on the investment. Furthermore, as explained previously, the operating expense will be increased so slightly that the cost per car will be decreased rapidly as traffic grows and as the classifications now made at Hammond, Ind., are transferred to Marion.

Handling Train Supplies on the Southern Pacific



Stockkeeping for Running Repairs to Cars at Los Angeles



Stock men and crews both win under plan of providing materials for cars and cabooses

THE Southern Pacific is now following a plan of handling train supplies on its Pacific System under which the store department is assigned all details of the service. Special racks and cabinets are provided along the track to hold materials for making running repairs to cars. The stock is trim, the racks erect and white, with clean sand on the ground.

This department also puts the torpedoes and fusees, buckets, brooms, switch chains, wrecking frogs, kerosene and order blanks in the cabooses. Car inspectors can find the right car bolt or rod handy without running a store department of their own under present conditions, and train men can board a strange caboose with the assurance that the tool boxes will hold the proper equipment when hot boxes and break-in-two's occur on the road. Partly as a result of these improvements, the charges to train expense for material are from \$5,000 to \$8,000 less per year on the Southern Pacific, in the face of an increased business.

Stock Book for Car Supplies

The present method of handling the supply work for running repairs to cars was made in the interest of the operating as well as the stores department. The question of accident avoidance was also involved.

Previously all materials for this work were obtained from the storehouse and carried to the yard by car men. The supplies were laid on the ground or boards or dumped into yard boxes, usually crude affairs about 3 ft. wide, 4 ft. high and from 6 to 8 ft. long, with a sloping hinged door. When a car inspector wanted a brake shoe or some other article found missing or broken on a train, he would look for it in one of these piles or yard boxes. About once a week a yard foreman or assistant would check the stock and place orders on the store department which would issue the material to car men who would carry it by hand or push car to the yard and distribute it to the boxes.

No regular place was assigned for the supplies and the method of keeping the stock was more or less haphazard. Some of the material did not receive the proper protection from weather and the piles were frequently a source of danger to train men or car men at work. The arrangement also resulted in surpluses of some kinds of stock, particularly those which car men found it inconvenient to distribute, but shortages of material also occurred and trains were sometimes delayed until inspectors or light repair men, failing to find what they needed in the yard boxes, obtained the material by special trips to the main store.

Under the present arrangement, the store department is charged with the work of both maintaining and controlling these yard stocks. The storage points, instead of being scattered more or less blindly through the yard, are now maintained in the most logical places and the yard boxes have largely been replaced by racks, shelves and containers, similar to those found in the storehouses. In the train yard at Los Angeles, for example, there are three of these supply stations, at each of which are maintained two shelf boxes, one road rack, one brake beam rack, a 2,000-gal. ground tank and pump for journal box oil, a box for scrap brass, a bin for scrap iron and a platform for journal packing. Each item of material has a designated place in these boxes and racks and is identified by a stencil. A stock book is maintained for this equipment and inventory is taken every 30 days. In each case, the material and facilities are arranged to serve the interests of safety as well as the convenience of those who use the material.

Check Caboose Every Trip

Before assigning the caboose work to the store forces, it usually fell to the rear end train man to go to the storehouse for the supplies needed except for such articles as car replacers, cables, etc., which were placed on board by the car inspectors. Later, with the pooling of some caboose equipment, it devolved upon the car forces to keep the cabooses supplied in accordance with their own inspections and memoranda left at the yard office by conductors.

The divided responsibility resulted in confusion. Controversies and much letter-writing were prevalent. The condition of the material was frequently blamed for train delays, and waste and abuse of the material was so well established that train masters and yard masters were often called upon to inspect the cabooses and make other investigations incident to the use of material.

This trouble has largely been eliminated, much to the satisfaction of both the store department and the train crews. Under the present plan, the store department assumes the responsibility of inspecting the condition of material on cabooses and keeping them supplied. Usually a storehouse man in each terminal is assigned to look after this work, which comprises 39 items of stationery and 64 items of other material for each caboose. The cabooses are inspected after every trip.

A standard list posted in each caboose shows the



Interior of Caboose Supply House at Sparks, Nev.

items which comprise the caboose equipment and gives the quantity of each item which a caboose should have in stock before leaving the terminal. This list also identifies the locker in which each item of material is located. The caboose lockers are all numbered to correspond with the description on the supply list and, after each locker is equipped with the necessary tools, a car seal is attached.

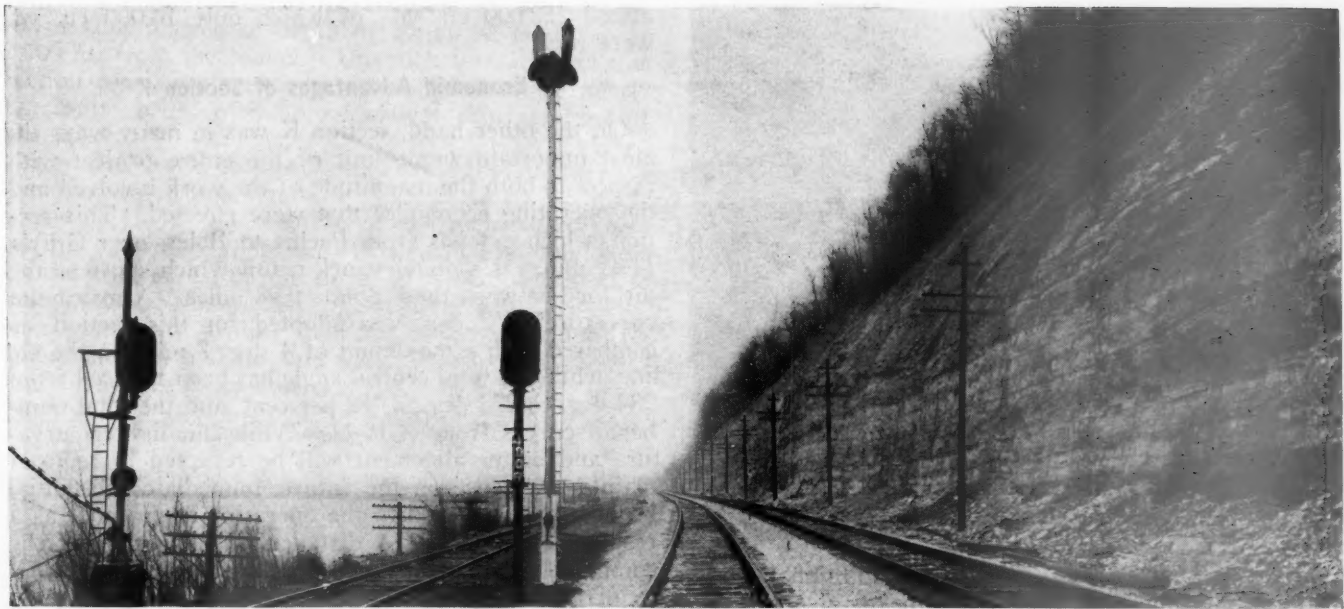
The advantages of the car seal are that it puts responsibility for missing articles on the trainman, once the seal is broken and also indicates the condition of the locker to the supply man. If a caboose enters the terminal with the seal intact, on any locker, that locker need not be rechecked. If the seal is broken, the supply man makes a complete check of the equipment in order to assure the caboose's leaving the terminal fully equipped. The list also designates, both for the information of the trainman and the store department, those articles which must be surrendered to the store department before new articles can be secured or the loss reported to the superintendent or train master.

Portable Stationery Cabinets

Each caboose is also equipped with a portable stationery cabinet, the pigeon holes of which are marked with the form numbers. When a caboose arrives in



Tidy Methods Have Eliminated Surplus and Shortage



Looking East from Boles, Section K, Old Main Track at Left

Missouri Pacific Completes Important Double Track

Major project in system improvement program involving heavy work is carried out under a five-year schedule

ONE of the major items in the construction program which the Missouri Pacific has been prosecuting during the past five years is the double tracking of its St. Louis-Kansas City line between St. Louis, Mo., and Jefferson City, 125 miles. This work, which is now practically completed, has required the expenditure of approximately \$19,000,000; has involved the construction of 104 miles of second track and of 16 miles of line on new location, in addition to numerous minor line changes to reduce curvature or eliminate tunnels; the adoption of a maximum curvature of 3 deg.; the reduction of ruling gradients from a maximum of 1 per cent to 0.3 per cent, compensated for curvature; the handling of more than 10,300,000 cu. yd. of material in grading, of which about 4,200,000 cu. yd. was solid rock, an equal amount was earth and 1,900,000 cu. yd. was loose rock; the placing of 81,000 cu. yd. of concrete and 5,750,000 lb. of reinforcing steel; and the erection of 7,975 tons of structural steel in deck and through plate girder spans.

At the time the double-tracking program on this line was started in 1925, the remarkable growth in business during the preceding five years had resulted in such a density of traffic that the economic limit of single-track operation not only had been reached but had been exceeded. Between St. Louis and Kansas City, the line passes through Jefferson City to Cole Junction, 4.1 miles west, from which point two single-track main lines extend to Kansas City; one a low grade line which follows the south bank of the Missouri river, and the

other a more direct route through the rolling country by way of Sedalia. Because of the more favorable grades, the river line is used by all tonnage freight trains, while passenger trains are routed over the line through Sedalia, which is about eight miles shorter than the freight line.

Between St. Louis and Jefferson City the line passes over the divide between the Mississippi and Meramec rivers at Kirkwood, and then occupies the narrow and tortuous valley of the latter stream from Lake Hill to Pacific, 19 miles, crossing a minor summit at Allenton, which has now been considerably reduced in height. From Pacific, the old line reached the summit of the divide between the Meramec and Missouri rivers at Gray's Summit on a 1 per cent grade, and then descended, at rates varying from 0.8 per cent to 1.42 per cent, to Labadie, from which point it follows the south bank of the Missouri river on a water grade to Jefferson City.

Scheduled on a Five-Year Basis

Prior to 1925, there were 13.43 miles of double track in the suburban zone between St. Louis and Kirkwood, and 5.24 miles through Jefferson City to Cole Junction. Owing to the amount of traffic handled over this district and the difficulty experienced in moving trains because of the crowded condition of the single track, it was clearly evident that a second track was required over the remaining 111 miles. It was equally evident, however, that, owing to the rugged character of the



Limestone Bluff on Section M

country traversed, this mileage of additional main track could not be completed in time to give the immediate relief that was needed. Furthermore, it was equally obvious that any effort to construct this entire mileage as a single project would result in so much interference with traffic that such a plan would be impracticable, so that this scheme was not considered seriously. For these reasons, operating studies were made and the work was programmed on a five-year basis. An average of approximately \$3,800,000 has been appropriated each year for the prosecution of this work, according to the progressive schedule that was adopted.

From these studies the construction for each year has been planned to give the maximum relief from traffic congestion, except that of the first year when it was desired to obtain the largest mileage of second track which was practicable with the funds available. The work up to and including 1927 was described in the *Railway Age* for October 1, 1927, page 663, and will not be mentioned further.

At the beginning of 1928, the additional second track in service amounted to 76.63 miles, comprising a continuous stretch along the south bank of the Missouri river from Jefferson City to Boles, together with a disconnected section 2.68 miles long between Eureka and Allenton, which was constructed as a part of the 1925 program to serve as a relief track for the meeting of trains during the morning and evening hours.

Section J, 5.38 miles long, located between Allenton and Pacific, follows the original alinement very closely, and involved no special features, except that it included a grade revision at Allenton to reduce the summit, of which mention has been made. Here the tracks were lowered 20 ft. and the grade reduced from 1 per cent to 0.3 per cent. The quantities on this section approxi-

mated 252,000 cu. yd., of which only 14,000 cu. yd. were rock.

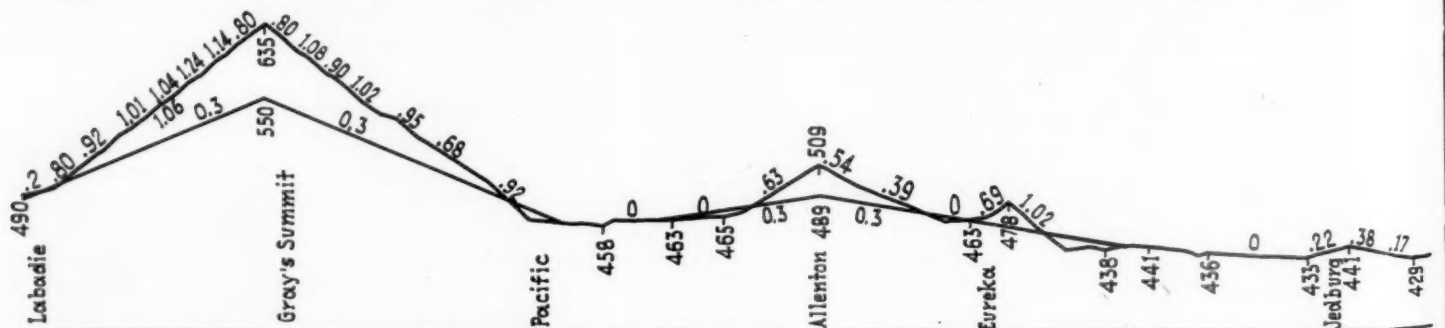
Economic Advantages of Section K

On the other hand, section K was in many ways the most important single unit of the entire project with respect to both the magnitude of the work involved and the operating economies that were effected. This section, which extends from Pacific to Boles, over Gray's, 11.41 miles, is a double-track cutoff which shortens the distance between these points 0.98 miles. A maximum curvature of 2 deg. was adopted for this section, as compared with a maximum of 4 deg. 7 min. on the old line, while the total central angle has been reduced from 984 deg. to 278 deg., or 72 per cent, and the total number of curves from 44 to 11. While this lighter curvature and better alinement will be reflected in reduced maintenance costs in the future, immediate substantial benefits have accrued to the operating department as a result of the decreased distance, the lowering of the summit elevation approximately 85 ft. and the marked reduction that was made in the ruling grade.

The former ruling gradients between Pacific and Boles of 1.24 per cent against eastbound traffic, and of slightly more than 1 per cent against the westbound movement, have been reduced to a maximum of 0.3 per cent, compensated for curvature, except for a temporary 0.5 per cent compensated grade about 1.8 miles long immediately west of Pacific. The line is so located, however, that this temporary grade can readily be reduced to 0.3 per cent when increased westbound traffic makes it necessary to do so, at the same time eliminating grade crossings through the town. In order to facilitate this work at a later date, the bases of the fills over the full length of this temporary grade have been widened a sufficient amount to support the additional embankment which will be required for a 0.3 per cent gradient and the elevated tracks through Pacific.

The country traversed by the cutoff is rugged and for this reason the low grade line that was adopted necessitated heavy grading, amounting to more than 2,000,000 cu. yd., of which 1,086,000 cu. yd. was solid rock. While the cutoff diverges widely from the old line at a number of points, the two lines are only about 150 ft. apart through the town, although the summit of the new line is about 85 ft. lower than that of the original line. For this reason, as well as to avoid an excessively deep cut, the new line passes directly under Gray's Summit in a double-track tunnel 1,580 ft. long. Just west of Labadie, $3\frac{1}{2}$ miles farther west, there is a second tunnel 550 ft. long.

The approaches to the tunnel at Gray's Summit are in deep rock cuts, that at the east end being about 4,000 ft. long and reaching a depth of 90 ft. While the west



Profile of Old Line from St. Louis to

approach is approximately the same length, it maintains its maximum average depth of about 80 ft. for only 2,000 ft. from the tunnel. The rock formation in this section consists almost entirely of limestone in nearly horizontal beds, with an occasional thin stratum of sandstone.

The deep rock cuts between Pacific and Boles have been excavated to a standard width of 43 ft., with side slopes of $\frac{1}{4}$:1. The contractor was required to carry out his blasting in these rock cuts with delay exploders on the trim shots, or the shots on the outside next to the slope, and this method of shooting, while requiring somewhat more drilling than the ordinary method, resulted in smooth slopes and the practical elimination of scaling by the contractor.

Gray's Summit Tunnel

The tunnel at Gray's Summit was driven entirely from the east end by means of a high-level center heading. The heading was first driven through to the west portal, after which the section above the spring line was removed. The bench was then taken out in two lifts. As work on the tunnel was started before the excavation in the approach cut had advanced to the east portal, a steep incline was drifted from the surface to the heading. The muck was hauled to the foot of the incline by mules, and the small mine cars which were used for this haulage were then pulled up the incline to the surface by means of a cable. They were dumped from a trestle located on a siding alongside the old line into standard gage cars for disposition on adjacent fills. Following completion of the heading, clearances were sufficient to permit an air-operated power shovel to be used for loading the muck from the bench. The total amount of tunnel excavation on this section was 73,400 cu. yd., all of which was solid rock.

The rock in the Gray's Summit tunnel lies so nearly in horizontal strata and broke so favorably that no timbering was required in the main heading or for the full tunnel section, except for about 30 ft. in from the east portal. As it was expected that considerable disintegration would occur in this rock when exposed to the air and the action of locomotive gases, the tunnel was lined with reinforced concrete.

The center heading was 8 ft. by 14 ft. in rectangular section. The excavated section of the tunnel measured 29 ft. 1 in. in height at the crown of the arch and 32 ft. 6 in. in width. These dimensions allowed for a lining 21 in. thick on the sides, which was reduced to 15 in. at the crown of the arch. All cavities caused by overbreak were filled with concrete, and, as the tunnel was practically dry, no provision was made for drainage in or behind the lining, except a few weep holes, and no floor slab was provided.

Two sets of collapsible steel forms were used at the east end for placing the lining, while three sets of



The Work on Section K Was Heavy

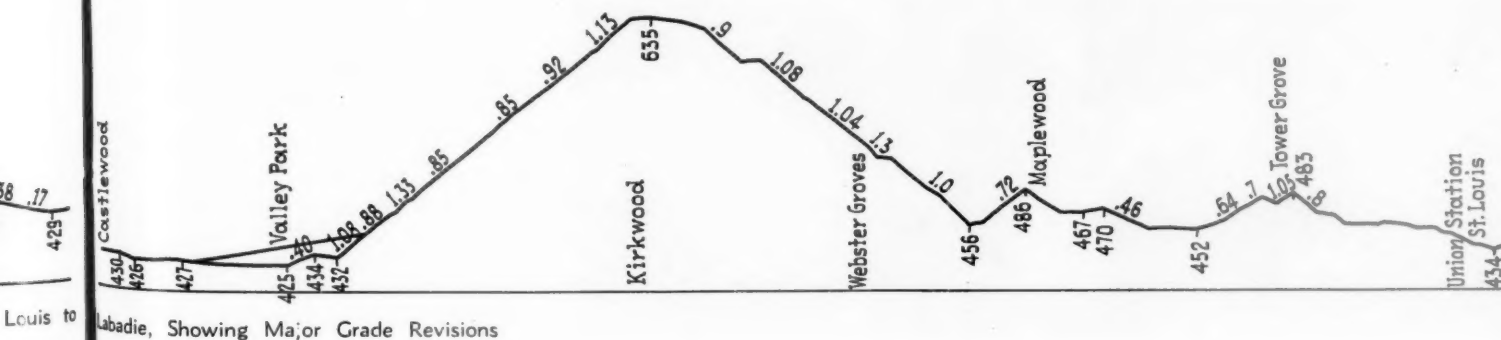
wooden forms were used for this purpose at the west end, the lining being completed progressively from both ends toward the center. The concrete footings and the bases of the side walls were constructed to a height of 2 ft. 6 in. above the floor in advance of the erection of the forms. The forms and reinforcing were then placed for a 20-ft. section where the steel forms were used and for a 40-ft. section at the west end where the wooden forms were employed. The concrete for the bench walls and arch was deposited in a continuous operation for each section. The average combined progress at both ends averaged 100 ft. a week.

The Program for 1929-30

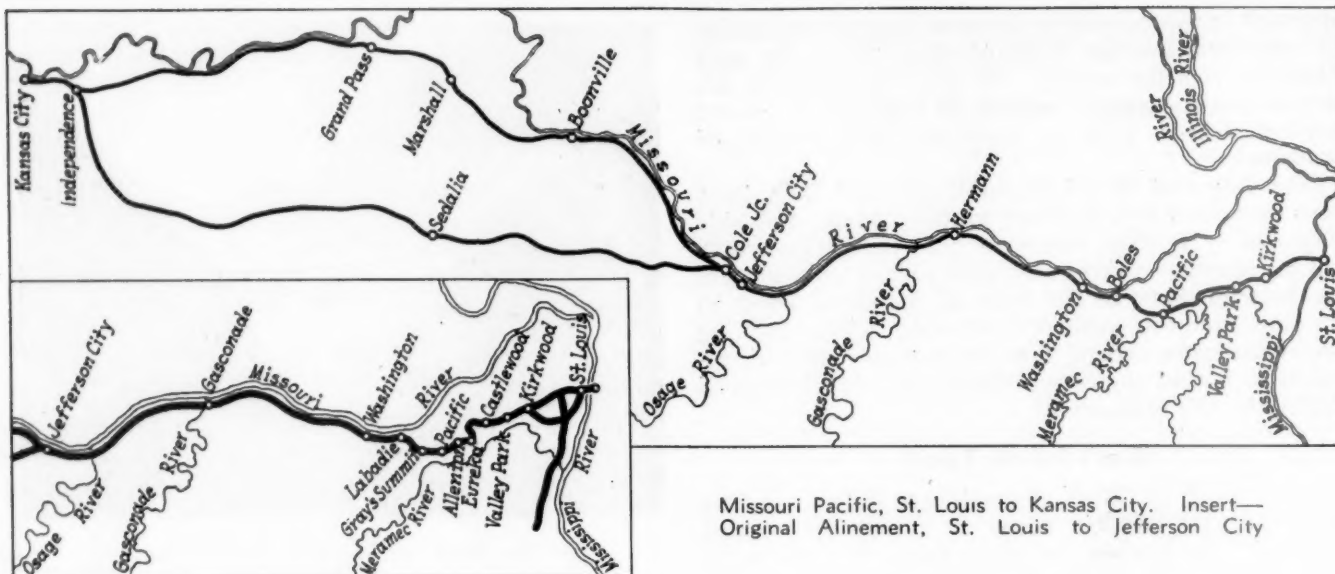
At the end of 1928 there was only 10.44 miles of the project, as originally planned in 1925, upon which no work had been done. At this time, 93.41 miles of second track was in service or under construction. The remainder yet to be done extended from Lake Hill, 17.52 miles west of St. Louis, on the east, to Eureka on the west, and included about seven miles of the heaviest and most difficult work on the entire project.

The valley of the Meramec is deep, narrow and tortuous. Between Valley Park and Eureka, the original line had been located on the north bank of this stream, and for a part of the distance was supported on a narrow shelf between the river and the limestone bluffs which rise to a height of 200 ft. or more. From Lake Hill to Jedburg there was little opportunity to improve the alinement further than to reduce the curvature, and this has been done to the practical limit of the possibilities, 2 deg. 30 min. having been adopted as the maximum rate of curvature on this section as well as on the cutoff west of Jedburg.

Between Jedburg and Eureka, however, a different



Louis to Labadie, Showing Major Grade Revisions



Missouri Pacific, St. Louis to Kansas City. Insert—
Original Alinement, St. Louis to Jefferson City

situation was encountered. Here the river makes a wide detour to the north, forming a valley about three miles wide. Since the old line followed the river, to avoid the two crossings of the stream which a more direct route would have required, a much shorter route with better alinement has been obtained by cutting almost directly across the valley between these two points.

Since the work east and west of Jedburg presented radically different problems, two sections were established, with Jedburg as the dividing point. Section L extends from Jedburg to Lake Hill, 6.91 miles. Here the grading is heavy, much of it being solid rock, and the excavation had to be made in cramped quarters adjacent to the busy operated line. Section M, on the other hand, between Jedburg and Eureka, is a double-track cutoff upon which the work was prosecuted without interference with or by traffic.

The Jedburg-Eureka Cutoff

This cutoff follows practically a direct line between the two stations, in contrast with the wide detour made by the old line. It shortens the distance by 1.96 miles and decreases the total central angle by 326 deg. or 64 per cent, while the total number of curves was reduced from 21 to 4. As another indication of the improvement in the alinement effected by the shorter route, the old and the new lines are approximately two

miles apart at their point of maximum divergence.

Cutting across the loop made by the river in its detour to the north necessitated the construction of two bridges. The upstream, or west crossing, consists of five 120-ft. and two 50-ft. deck-girder spans supported on concrete piers and abutments. A separate overflow opening consisting of one 80-ft. deck-girder span on concrete piers and 624 ft. of ballasted-deck creosoted timber trestle, spans an old arm of the river. The piers for the river crossing are carried to bed rock from 30 to 45 ft. below low water. The abutments, of the rigid-frame type, are supported on concrete foundation piling driven to bed rock. The two piers for the overflow bridge are supported on untreated foundation piling.

The downstream, or east crossing, immediately west of Jedburg, consists of five 120-ft. and nine 80-ft. deck-girder spans supported on concrete piers and abutments which are carried to bed rock located from 20 to 35 ft. below low water, except the west abutment which is supported on foundation piling. The footings of the west six piers which are outside of the river channel proper are each supported on two 12-ft. concrete cylinders carried to bed rock. All foundations for the river crossing were constructed with steel sheet-pile cofferdams and by open dredging. The two river crossings involved the handling of 10,500 cu. yd. of wet excavation, 15,600 cu. yd. of concrete, 984,500 lb. of reinforce-



Bridge over Grand Glaise
Creek East of Valley Park

ing steel, and 8,560,300 lb. of structural steel. Open timber decks are used on the two main river crossings, except on the east span at Jedburg and the west span at Eureka, both of which have reinforced concrete decks to accommodate the spirals which extend over these spans.

In addition to the river bridges, there are three overhead highway crossings and one highway undercrossing, all of reinforced-concrete construction. There are no highway crossings at grade in this section. The old line between Jedburg and Eureka is retained to serve certain industries and communities in this section.

The original grade line through the valley of the Meramec river was based on the high water elevation of 1844, the greatest flood then on record. During the floods which occurred in this territory in 1915, however, a new high water mark was established about four feet above the top of rail. For this reason, in planning the second-track work between Valley Park and Pacific, a new grade line was established at an elevation above the 1915 flood plane.

Character of Work East of Jedburg

For practically the entire distance between Lake Hill Jct. and Jedburg, the revision of alignment was restricted by lack of support, streets in Valley Park and the narrow shelf between the bluffs and the Meramec river. So far as practicable, the new alignment was kept north of the existing main track, both to secure support for the higher grade line and to avoid interference with traffic, but, since the original line followed closely the river and the bluff contours west of Valley Park, this revision made it necessary to cross the old line at 11 different points and required very heavy side cutting in the vicinity of some of these crossings. At Valley Park the old main line began to climb out of the valley of the Meramec and continued toward the east on a grade approximating one per cent to Kirkwood, where it reached the summit, as already explained. In order to maintain the 0.3 per cent grade to Lake Hill Jct., it was necessary to elevate the tracks about 20 ft. through Valley Park and to construct bridges at the three intersecting streets. It was also necessary to construct a wall to retain the embankment along a parallel street on the north. The work between Lake Hill Jct. and Jedburg involved, therefore, a complete revision of both grades and alignment over the entire distance.

Since there was no material available in the immediate vicinity for the construction of the high embankment through Valley Park and its extension to Lake Hill Jct., it became necessary to haul this material from a considerable distance. The first cut, about 6,000 ft. long, west of Valley Park provided about 125,000 cu. yd. In addition to this cut, which was mainly bluff detritus, a borrow pit about 1,500 ft. long was opened to provide 150,000 cu. yd. A similar borrow pit was opened at Castlewood, about four miles west of Valley Park, from which an additional 150,000 cu. yd. was obtained. The remaining 280,000 cu. yd. of material needed for this fill was obtained by widening a cut on the revised alignment near Lake Hill, this material being handled by a narrow-gage outfit.

Interference From Trains

In carrying out the work through Valley Park, excavation was started simultaneously in the cuts east and west of the town. On the west, the contractor took out the first cut to the final grade and of sufficient width to accommodate a standard-gage track and the necessary sidings, thus enabling him to handle ap-

proximately 250,000 cu. yd. from the cut and adjacent borrow pit with minimum interference with traffic. This was an important item since there were often as many as 35 revenue train movements over the operated line during the working period of the day.

It was impracticable to work independently from the Castlewood borrow pit because of the numerous crossings of the old main line in that vicinity. On this part of the haul the interference from traffic was considerable, since it was required that the contractor's train clear the time of all first and second class trains and some of the third class trains five minutes. Considering that revenue train movements frequently averaged one every 20 min. and that the main line haul was more than $3\frac{1}{2}$ miles, it will be seen that the problem of moving the construction trains was a serious one. To facilitate this movement, two intermediate construction sidings were built to allow work trains to clear revenue traffic and also to pass one another.

Filling at Valley Park

Owing to the fact that the construction of the street undercrossings and other bridges was carried on simultaneously with the placing of the fill through and east



West Portal of Labadie Tunnel

of Valley Park, it was impracticable to approach the fill on a trestle from either end, and advantage was taken of a small cut at East Valley Park, which was to be filled, to run dirt trains up an incline and dump and widen to approximately the finished embankment. This widened embankment was then used to provide tail room for a switch back, allowing trains to go up the incline and onto a trestle built in both directions from this first fill. Borrow from Castlewood was handled in this manner prior to the time the undercrossings were finished. In addition to the difficulty experienced from this cause, the finished slope of the new embankment extended beyond the operated track on the south, making it impossible to complete the full section for double track until the new westward track had been placed in service on the new grade, after which the old main line was removed and the fill was widened to full section.

The total grading on this section amounted to approximately 1,200,000 cu. yd., of which 712,000 cu. yd. was solid rock and 264,000 cu. yd. loose rock, mainly bluff detritus. Approximately 40,000 cu. yd. from this section, all of which was obtained on the revised alignment back of Jedburg, was placed on Section M to construct the east approach to the first Meramec river

bridge on the cutoff, and to make the connection with the new westbound main track and the old line at Jedburg. The diversion of Grand Glaise Creek between Lake Hill Jct. and Valley Park required 42,000 cu. yd. of excavation, removed by means of a dragline outfit, all of which was unfit for embankment use and was wasted.

The revision of alinement between Jedburg and Lake Hill required the construction of new bridges for both tracks. In addition to the stream crossings, bridges of the reinforced-concrete type with ballasted deck were constructed over four highways. The quantities involved were 12,400 cu. yd. of excavation, 13,500 cu. yd. of concrete, 1,355,300 lb. of reinforcing steel and 708,800 lb. of structural steel.

Signal Installation

Prior to 1925 the road between St. Louis and Jefferson City was equipped with automatic semaphore signals. When the construction of the second main track was started, a program was worked out to provide complete signal protection for operation in either direction on both main tracks. Color-light signals were installed and wherever conditions did not require the continuous services of operators at the ends of double track, the switches at these points were remote-controlled from the nearest telegraph office.

These installations kept pace with the completion of the various sections of second track up to and including 1928. By 1929, however, traffic had increased to such an extent as to warrant the installation of a system of centralized traffic control between Kirkwood and Washington. The control point is at Pacific, where the operator controls not only the signals directing the movement of all trains within these limits, but also handles by remote control the switches at either end, as well as double crossovers at two intermediate points.

New Line Proposed

The second track out of St. Louis now ends at M.P. 14.48. The easterly limit of the second track work, as described, is at M.P. 17.52 at Lake Hill Jct. This leaves a gap of 3.04 miles of single track rising toward the east on a grade approximating 1 per cent. The revision of this grade and the construction of a second track to fill this gap are not contemplated at this time, because consideration is being given to the desirability of constructing a new low grade line from Lake Hill Jct. to the Mississippi river south of St. Louis, together with a river crossing and connection to Dupo yard, just south of East St. Louis, which is the principal terminal and exchange yard of the Missouri Pacific in the St. Louis territory. If constructed, this line will have a definite advantage in that it will bypass the heavy traffic which is destined to southern and eastern connections around the congested switching district, which it now encounters in passing through St. Louis, and will substitute a bridge crossing of the Mississippi, for the car transfer ferry service which is now maintained.

The entire project has been planned and carried out under the general direction of E. A. Hadley, chief engineer, and S. L. Wonson, assistant chief engineer, with C. S. Sample, construction engineer, in direct charge. C. F. Ehrlich, assistant engineer, located the cutoffs between Pacific and Boles and from Jedburg to Eureka, as well as other revisions of alinement. D. F. Tracey and R. L. Ehrlich, assistant engineers, had charge of the field work on Sections L and M, respectively. E. L. Freeland and R. P. King were resident engineers on the cutoff between Pacific and Boles.

F. E. Bates, bridge engineer, designed the bridges and directed their construction. P. M. Gault, signal engineer, designed and installed the signal layout.

Freight Car Loading

REVENUE freight car loadings in the United States for the week ended March 28 totaled 740,079, according to the compilation of the Car Service Division of the American Railway Association, this figure being a reduction of 16.4 per cent from last year, 23.6 per cent from 1929 and 1863 cars less than the preceding week.

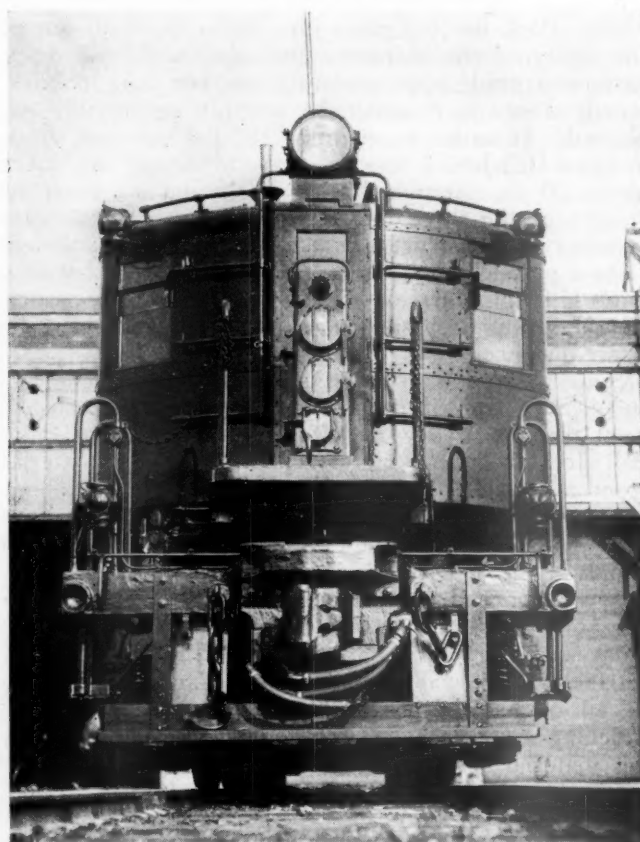
The freight car surplus for the period ended March 23 averaged 621,926 cars, a decrease of 4,964 cars as compared with the week before. The total included 302,261 box cars, 249,009 coal cars, 32,527 stock cars, and 14,623 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended March 28 totaled 49,416 cars, a decrease of 245 cars from the previous week and a decrease of 8,113 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
March 28, 1931	49,416	30,167
March 21, 1931	49,661	30,016
March 14, 1931	48,217	29,011
March 29, 1930	57,529	36,361
Cumulative Totals for Canada		
March 28, 1931	607,795	365,115
March 29, 1930	740,134	477,607
March 30, 1929	805,329	561,121

* * *



One of 42 C+C Type Electric Locomotives for Use by the New York Central on the West Side of New York City Leaving the Erie, Pa., Works of the General Electric Company



A Typical
Aroostook
County
Snowfall

Unique Operating Conditions Met

Bangor & Aroostook attains efficiency
despite physical handicaps

DESPITE light traffic and unusually severe winter conditions, the Bangor & Aroostook was able to maintain an operating ratio of 63 per cent during the first nine months of 1930. This result has been brought about by efficient operating methods, and by attention to every detail whereby a saving could be effected. One of the outstanding performances is the handling of trains up to 6,800 tons over a portion of the road handling a large proportion of perishable traffic, without sacrifice of fast service.

Traffic Handled

The Bangor & Aroostook operates 614 miles of lines in northern and eastern Maine, extending from Searsport, Maine, on the Atlantic ocean, to the St. John river, which forms the boundary between Maine and Canada. This railroad originates more cars of newsprint paper and of potatoes than any other railroad in the country. In the year 1929, 12,853 cars of newsprint paper were loaded on the B. & A., as compared with a total for the entire country of 59,111 cars. For the calendar year 1930, the B. & A. handled 43,580 cars of potatoes out of a total of 243,082 cars loaded in the United States as a whole. In spite of the paper and potato traffic, however, the railway handles a light, and practically seasonal traffic, which, in addition to the two commodities mentioned, consists only of relatively small amounts of general freight. Some years ago, lumber was a considerable item, but in recent years, logging has ceased to be profitable in the section of Maine traversed by the line, and lumber has become a negligible factor in the total traffic handled. Moreover, most of the traffic of the B. & A. originates on the line. The percentage of empty to total car miles northbound averages around 55 per cent and much of the northbound loaded traffic is made up of company coal. The only through business handled is that interchanged with the Canadian National at Van Buren, Maine, and represents less than one per cent of the total tonnage.

The greatest traffic density occurs between Millinocket and West Seboois, 14 miles, and even here the maximum number of trains handled per day amounts to only 15 in each direction for a few days each year. All the traffic originating north of Millinocket must pass over this stretch of line and on arrival at West Seboois, it is divided between cars going to connections at Northern Maine Junction and to ships at Searsport, and cars for delivery to the Canadian Pacific at Brownville Junction or Greenville.

Apart from this one busy stretch of track, there is a considerable portion of the line where only two trains are operated in each direction per day, one of these being a passenger train, while in some places only one mixed train is operated in each direction per day. On 269 miles of the 614 miles of road operated, there is a fixed freight service of this type that cannot be reduced; that is to say, the territory is served either by one freight train a day in each direction or by one or more mixed trains which handle all of the business offered at any time of the year, and, during a great part of the year, the business offered does not come in sufficient volume to furnish a full train load. Thus, on 44 per cent of the total mileage, the service is at the minimum at all times of the year, and cannot be reduced further in periods of light traffic.

Adverse Weather Conditions

As will be described, the B. & A. has been able to solve most of the problems that are put upon it by the light traffic available, problems that are further complicated by the seasonal nature of the traffic. Instead of handling one-twelfth, or 8.33 per cent of the total business each month, less than 5 per cent of the year's business is handled in some of the summer months, while, in the winter, 14 per cent of the total yearly business is sometimes handled in one month. The potato traffic, which amounts to 30 per cent or over of the total, moves principally during the months of October to April,

inclusive, this traffic ranging from about 1 per cent of the total handled in July, to about 50 per cent of the total handled during the month of October. This further complicates matters, since winter operations are unusually difficult on this railway.

By far the greater proportion of the mileage of the Bangor & Aroostook is located north of the 45th parallel, and some of it is north of the 47th parallel, the section producing the greatest portion of the traffic being about 46.5 deg. north latitude. This section of Maine not only experiences extremely cold weather during the winter months, but also is subjected to unusually heavy snowfalls. A 10-year survey during the four winter months,



Winter on the Fort Fairfield Branch

December to March, inclusive, shows that on the Northern division the highest temperature averaged about 32 above zero, while the lowest temperature was 47 deg. below zero. On the Southern division the average high is slightly above 35 deg. and the lowest was 38 deg. below zero. Practically every winter there are as many as 10 days in one month when the temperature does not get above zero during the entire 24 hr.

The average annual snow fall at Houlton, at the southern end of the potato-producing region, is 124.7 in., according to reports of the Weather Bureau at that point. From an operating standpoint, however, the drifting snow is a considerably more serious problem than the snowfall itself. A 10-year survey reveals the severity of the snow conditions. During this time, on the Northern division, snow fell an average of 30 days per year, and drifted 23 days of the year, while on the Southern division, snow fell during 48 days annually and drifted 20 days annually. Snow plows and flangers were operated an average of 50 days annually on the Northern division and 54 days on the Southern division. During the winter months there is almost never a day when there is not at least one crew on the railway handling snow. In February, 1926, for example, 27.7 per cent of all the crews employed were handling snow-fighting equipment.

Winter Operations

In view of these conditions, the railway has naturally given considerable study to the problem of fighting snow. Originally, plows and flangers were run to keep the line clear, and these piled the snow along the side of the track until, toward the end of the winter, the trains were practically operating through a roofless tunnel of snow. This had the disadvantage of creating a cut in which all the drifting snow for miles around gathered. By the use of winged plows, these cuts are now considerably widened, so that they do not fill in so readily with drifting snow, which has had the effect of reducing the interference to traffic and also of curtailing

the plow train mileage to a certain extent. Ballast spreaders are used with considerable success in removing the snow from tracks in yards. These spreaders push the snow across one track onto another until it is all pushed off at the side of the yard, or, where conditions do not permit of this method, the snow is left in one accumulation where it can be loaded readily onto cars by a derrick operating a clam-shell bucket. Four of these spreaders are now operated during the winter.

Snow Removal Costs

Even with the greatest efficiency, snow removal is an expensive proposition for the Bangor & Aroostook. Over a period of ten years, the average annual cost for removing snow and ice has amounted to \$122,000, or slightly over 10 per cent of the total cost of maintenance of way and 2.3 per cent of the total operating cost. Figured on a monthly basis, the average cost of removing ice and snow for January amounted to 39.5 per cent of the total maintenance of way expense and 7.9 per cent of the total operating expenses. Under particularly severe conditions, this cost has been known to reach \$107,500 in a single month, or 71.9 per cent of the total maintenance of way cost and 21 per cent of the total operating expenses.

The snow storms and drifts, together with the low temperatures experienced, require a careful and continuing supervision of train tonnage. Three separate locomotive tonnage ratings are used. The summer rating is usually maintained until about December 1, when a cut is made to 92 per cent of this rating, which tonnage is maintained as long as possible, until drifting snow or low temperature forces a further cut to 85 per cent of the summer rating. Thereafter, the rating is changed to meet the weather conditions from day to day. Cost figures have been prepared which show that the same volume of traffic can be handled in the summer months for 35 per cent less than in January.

These severe winter conditions have their reaction in the spring, and extreme care is necessary in operation to avoid accidents. It is by no means uncommon for frost to penetrate to a depth of five feet under the track. This causes a heaving of the roadbed, and requires much labor to keep the track shimmed to a good surface. During the spring thaw, the embankment is also softened and the gravel ballast is mixed with the earth of the subgrade, requiring frequent renewals of ballast. The uneven surface caused by the heaving and settling of the track when the frost goes out, causes unusual wear on the rails and the shimming and frequent respiking materially shortens the life of the ties. It is practically necessary to rebuild the railroad every spring.

The large amount of ballasting necessary every year was formerly done by contract. However, this is now being done much more cheaply by the railway forces. A transportation officer is specially assigned to supervise the operation of the ballast trains, and, after some years of operation, the cost of ballasting, which, under the contract system, was from \$1.20 to \$1.54 per cu. yd., is now from \$0.53 to \$0.62 per cu. yd., which reduction in expense has permitted the railway to apply more ballast and to get the road into good condition more quickly in the springtime.

Expenditures Supervised

The Bangor & Aroostook has always been handicapped by the light volume of traffic available, and by the lack of prospects of any substantial increase. As will be described in a future article, the potato movement from Aroostook county has been developed to a very

large extent, but this traffic is largely seasonal and does not make up for general traffic. The management realized years ago that additional earnings could not be hoped for through a material increase in the business, as the opportunities for such increase were limited. Therefore, it has been necessary to give special attention to efficiency in operating methods and to the keeping down of all costs. This has been carried out in a manner which would probably not be possible on a larger railway. Every item of cost has been carefully scrutinized and every operating method has been gone over thoroughly with the idea of discovering a better and less expensive way of doing the same thing. Staff meetings are held at frequent intervals, and at these meetings minute surveys are made of the entire operation of the road with the idea in mind of eliminating every possible item of expense that can consistently be eliminated. At these meetings, reports of the staff employed at every point and the train service on every mile of road is carefully considered with a view of finding the most efficient way of doing the work without unnecessary force or overtime. Ninety per cent of the freight trains that are operated are classified as local, that is, they are trains that do station switching, load or unload l.c.l. freight, and pick up or set out cars enroute. The preponderance of local freight service, together with the rapid changes in the volume of traffic offered and the requirements of operation, make the planning and supervision of transportation decidedly difficult. For the purposes of supervision, the railroad is divided into two divisions, the Southern division, which consists of the main line and branches south of Oakfield, and the Northern division, which consists of the main line and branches north of that point. Each of these divisions is administered by a superintendent and two trainmasters. The additional trainmaster on each division was put on some years ago to assist in checking the work of train crews, to see that such work is done in the most efficient manner, and to exercise control of overtime. The trainmasters are all field men and have no office force.

Piece Work and Bonus System

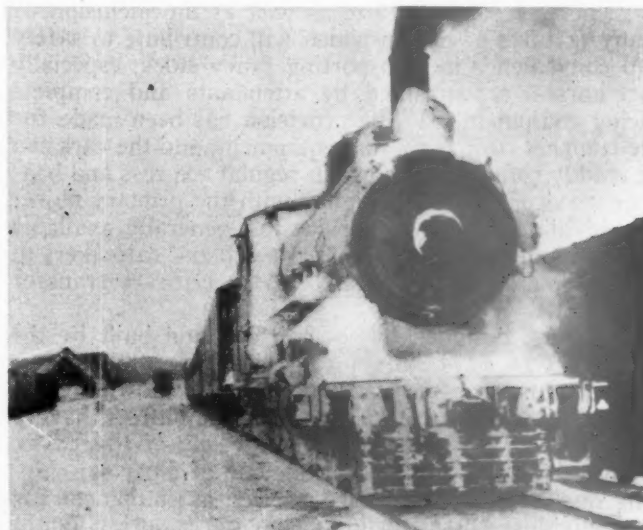
In order to obtain the best results in the mechanical department, a piece work system has been established in the car shops, while the locomotive works operate under a bonus plan. Under the piece work system in the car shops the cost of labor for car repair work has been reduced about 30 per cent, and through proper inspection and supervision the quality of the work has improved. Since the shops of the B. & A. constitute the only industry at Derby, Me., the railroad has established a stabilization of employment plan, whereby a number of new cars have been built in the railway shops annually, thus holding approximately the same number of men at work all the year round. The piece work idea has been extended to the building of the new freight cars, with substantial savings in the labor cost.

The establishment of the bonus system in the locomotive shops has been gradual and now about 35 per cent of the locomotive repair work in the main shop is done on a bonus basis. This covers all sorts of operations, from the removal of a staybolt to the application of side sheets. This latter operation, which, on an hourly work basis, costs \$275 per engine, now costs only \$187 per engine. A smaller operation such as the preparation of an axle for the applications of wheels, which formerly cost \$2.24, now costs \$0.80. Under this system, the saving in labor cost at the locomotive shops amounts to approximately \$10,000 a year, which figure is being increased as the bonus system is elaborated to cover more operations. This saving is net after making allowances

for the increased supervision necessary to check the bonus work.

By reason of the distance from the coal mining territory, the item of fuel costs has always been an important one among operating expenses, and fuel consumption has been watched most carefully. A number of years ago individual coal records were established for each engineman on an engine-mile basis. Later this was changed to a ton-mile basis and still later, in addition to continuing the use of the ton-mile basis as a measure of efficiency in the use of fuel by engine crews, an allowance for handling a certain amount of tonnage was put up for both passenger and freight service. Engine crews on comparable runs are matched against each other and there is a great deal of friendly rivalry among the men, which is promoted further by the fact that practically all locomotives are assigned on the B. & A. All coal is either weighed or measured before being put on the tender, so that the supervisory officers have an accurate record of the coal delivered to each locomotive. Weekly and monthly bulletins are issued, showing to each member of the engine crew what their individual rank is, and also showing what the other engine crews on the same runs or in similar classes of service are doing.

In all, the Bangor & Aroostook represents an interesting study in what may be accomplished in railway operation, even under the most adverse conditions, if sufficient attention is given to the supervision of each detail, and if no savings, however small, are overlooked. A considerable factor of this success may be attributed to the fact that the supervisory officers are all men with years of experience on this railway and thoroughly conversant with the particular needs of efficient operation under the severe weather conditions existing. Another aid is the fact that the supervisory officers are all acquainted with their individual capabilities under stress,

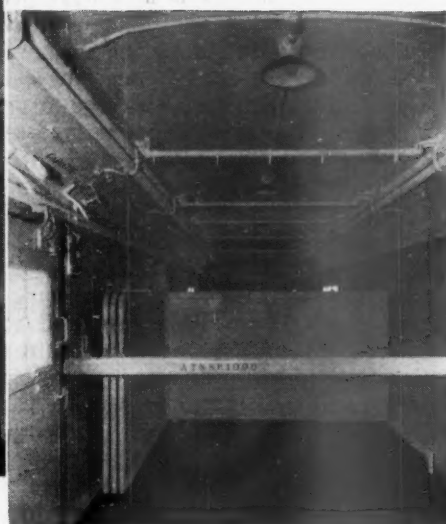
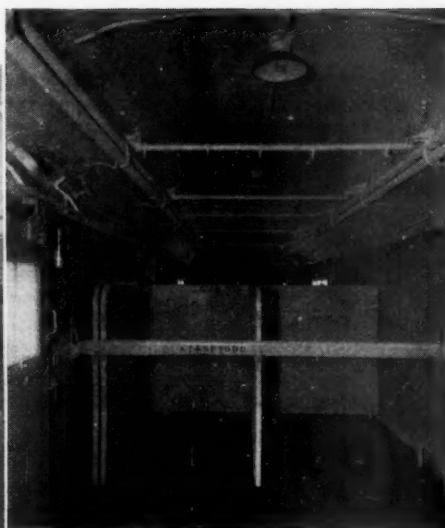
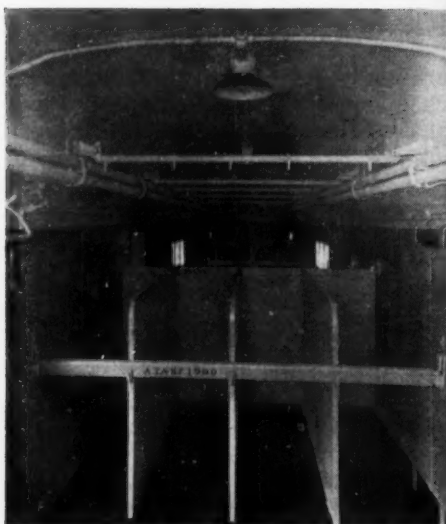


A Train Arriving at Presque Isle

which becomes a most important matter on a railway where extraordinary operating conditions prevail.

As a result of this careful supervision of operations, the operating ratio, which was 90.82 in 1920, had been reduced to 71.60 by 1925, to 68.77 by 1928 and to 65.46 by 1929, an excellent illustration of the efficiency attained.

An article on the methods used by the B. & A. in the handling of the potato crop, which amounts to over 30 per cent of the total traffic, will appear in an early issue.



Interior Views Illustrating the Flexibility of the Stall Arrangements—Overhead Sulky and Feed-Bar Equipment Are Shown

New Santa Fe Horse Express Cars

Designed primarily to combine large capacity with maximum safety and convenience in handling horses

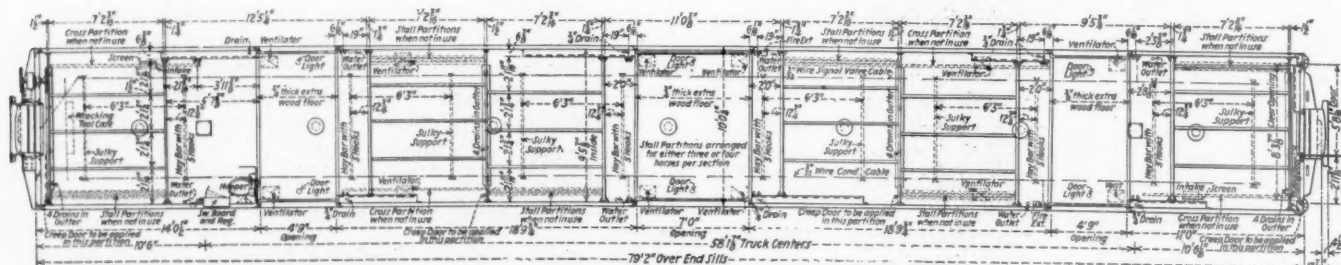
THE Atchison, Topeka & Santa Fe has recently placed in service ten new horse express cars, notable for large size as well as the inclusion of many features of design which will contribute to safety and convenience in transporting fancy stock, especially race-horses, accompanied by attendants and complete racing equipment. While provision has been made for the compact storage of stall equipment, and the cars can be readily converted for use in regular express and baggage service, they are designed with the primary object of providing a class of service not generally available in the shipment of thoroughbred stock and caretakers to fairs, horse shows, or in any other necessary transfer movements.

The cars, designed by the railroad and built by the Pullman Car & Manufacturing Corp., are the largest cars of this type yet constructed. As shown in the table, they are 82 ft. 2 in. long over the buffers, have a floor space of 736 sq. ft. and a light weight of 164,000 lb. Many race-horse trainers use one end of a car for shipping one or two automobiles, as well as equipment for the individual horses, including polo accessories, jump-

ing bars, saddles, blankets, etc. The exceptional length of the new Santa Fe horse express car provides ample space between the stalls for the location of trainers' cots, hay, feed and other commodities usually moved with the horses. The interior arrangement of the car is designed to meet fully the recommendations of the Horsemen's Transportation Association for the safe and satisfactory transportation of horses.

To facilitate loading automobiles and other large articles, one end of the car is made in the form of a double cast steel swinging end door, which extends the full width of the car and up through the upper deck construction to provide maximum height as well as width of opening. The substantial end door hinges, of the multiple-bearing type, are cast integral with the frame and with the door sections. They are designed with ample capacity to assure safety and to permit opening or closing the door sections with relatively little effort. A double set of locking bars on each section of the door holds it securely in the closed position while the car is in motion.

The larger section of the double end door contains a



Floor Plan of the Horse Express Cars Showing the Partitions Arranged for 24 Stalls

small sliding door with a 2-ft. 6-in. door opening. The opposite end of the car is also equipped with a single sliding door, provided, in this case with a 3-ft. opening. Three all-steel doors, located on each side of the car, are equipped with large ball-bearing hangers to provide easy operation. There are no side windows in the car as their application might cause the horses to be startled and frightened by the passing of other trains, or rapidly moving objects. Experience has shown that the omission of the side windows tends to permit delivering horses to their destination in better condition than would otherwise be possible.

Safe Handling Given First Consideration

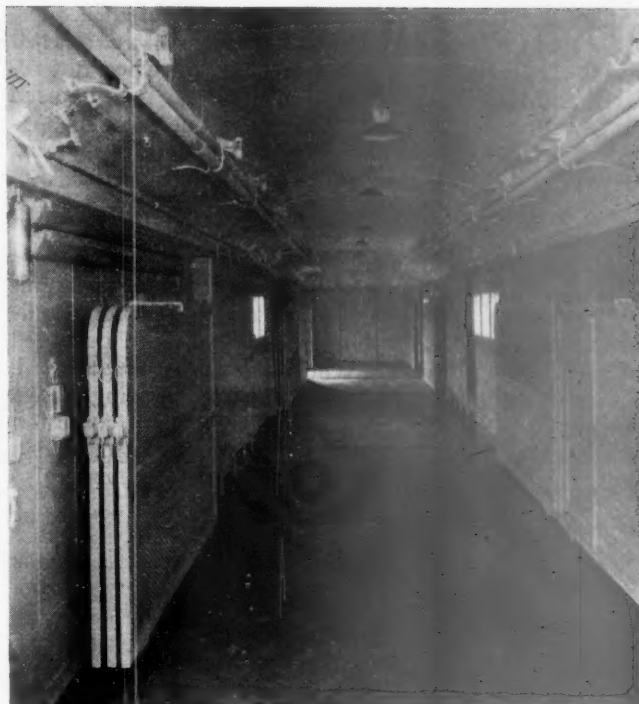
The interior arrangement of the cars is shown in the drawing. Particular attention has been given in the design to provide smooth surfaces, and eliminate, to the fullest extent practicable, all possibility of injury to animals. Danger in the event of derailment or wreck is minimized by heavy all-steel construction and the use of anti-telescoping cast-steel end frames, with large corner brackets, and platforms and double body bolsters cast

Principal Dimensions of Santa Fe Horse Express Cars

Length over buffers coupled	82 ft. 2 in.
Length center to center of trucks	58 ft. 1 3/4 in.
Length inside between lining	78 ft. 4 3/8 in.
Width over side sills	9 ft. 6 in.
Width overall at eaves	10 ft. 1 3/8 in.
Width inside between lining	9 ft. 5 7/8 in.
Height inside at top of floor to underside of headlining	9 ft. 4 in.
Height top of rail to top of roof center of car ..	14 ft. 2 3/4 in.
Floor space	736 sq. ft.
Light weight of car	164,000 lb.

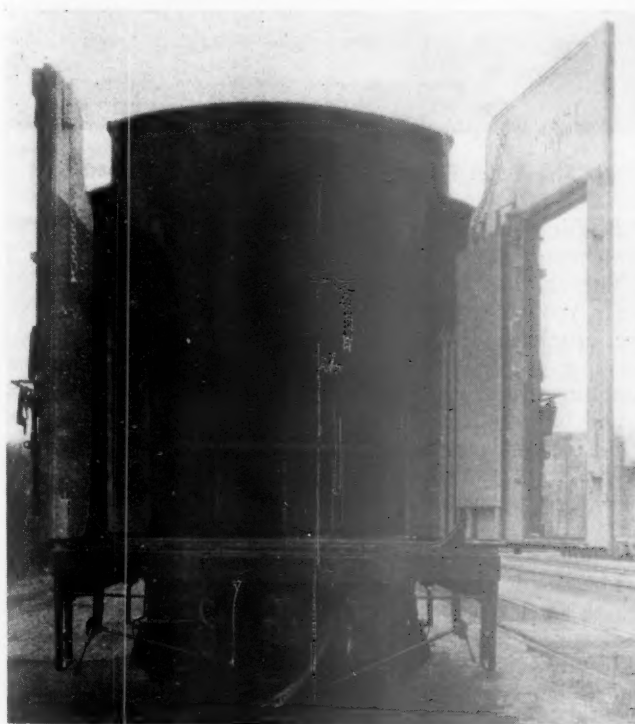
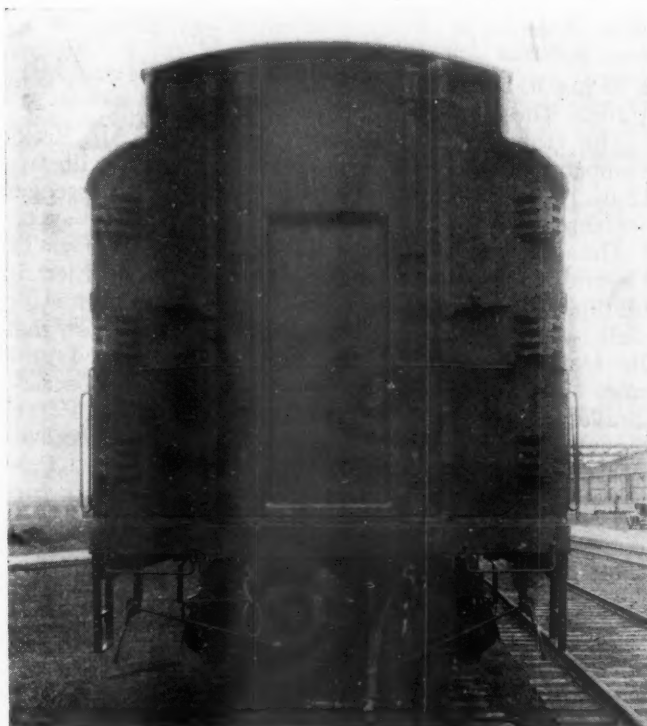
integral. Self-locking center pins are provided to prevent trucks from leaving the car body, and the heavy cast-steel end doors also contribute to safety in operation. Safety bars are applied above all side doors, and all safety appliances meet the Interstate Commerce Commission's requirements.

The stall equipment provides for a maximum of 24 stalls, arranged in six sections, each, for one, two, three, or four horses, as desired. When not in use, the stalls



Car Interior with the Stall Equipment Stored, Ready for Express or Baggage Shipments

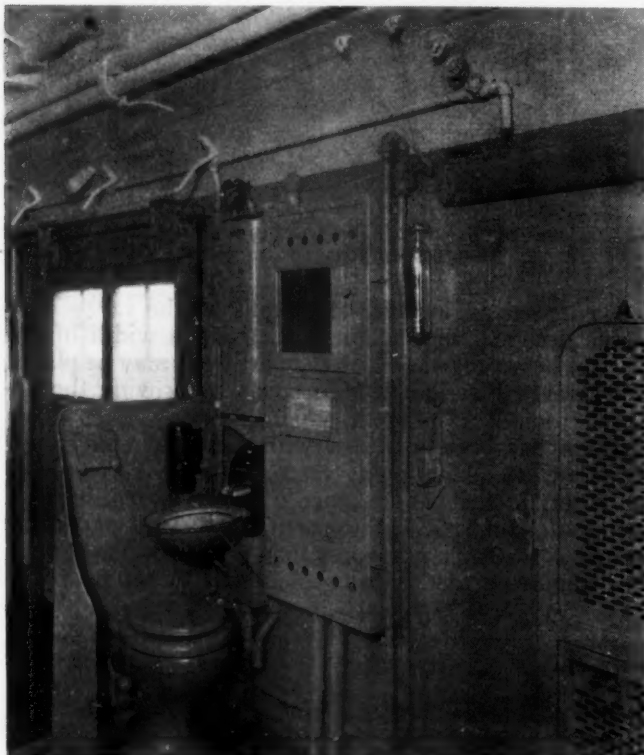
are collapsed against the side walls of the car. They are so designed that a box stall, the full width of the car, can be arranged for, or the partitions may be placed at whatever location desired so as to provide the required room for large or small animals. Each cross partition has been provided with a hinged creep door to permit attendants going from one end of the car to the other, in the performance of their duties, without having to climb over the partitions. This particular feature is available when less than a full complement of four horses abreast is being shipped.



Closed and Opened Positions of the Double Cast-Steel Swinging End Door in the Santa Fe Horse Express Cars

Sulky and haybar supports, consisting of 1¼-in. pipe, are located in the upper deck at the deck sill and hinged so that they can be folded against the sill when not required and secured by a latch when the car is to be used in other service. Breast bars, made in one piece of 3½-in. seamless steel tubing, flattened to 4½ in. by 1¾ in., are equipped with cast-steel brackets at the ends, and stored, when not in use, on the side walls above the storage space for stall partitions.

Recessed urine drains, located crosswise of the car under the kick board, assure proper drainage and sanitary conditions. The hard pine floor is laid longitudinally of the car, and a double floor has been provided in the doorway sections where no stalls are located. This is in order to raise the doorway flooring above the level of the stalls and maintain it in a dry condition for the comfort of caretakers. A water cooler and a folding washstand with hot and cold water faucet, also



The Toilet Facilities for Caretakers and Trainers

a flushing hopper, have been provided for the convenience of caretakers.

The car has an air-pressure water system, including tanks with a storage capacity of 500 gal. Water connections are provided inside of the car at each door opening, located diagonally and equipped with a hose attachment and control valve. Water and feed troughs, it will be noted from the illustrations, are not incorporated in the design of the interior arrangement, but the haybars are provided for the attachment of individual feed-bags, or water buckets.

Adequate Heat, Light and Ventilation Provided

The inside finish of the car is made of ¼-in. open-hearth steel, except at the bottom where ⅜-in. sheets are used for greater strength. The car interior is painted light tan below the ceiling, which is finished in white. The floor, side and end walls, and the roof are thoroughly insulated to facilitate maintaining a uniform temperature in the car. This end is also promoted by the use of weatherstrip at all door posts, headers, etc.

The Vapor system of car heating is installed, including metallic steam heat connectors. The radiating pipes of the heating system are placed in the upper deck. All steam pipe connections, necessarily located lower in the car, are carefully insulated and covered with well-rounded housings to avoid the possibility of injury to the horses. A total of 12 large exhaust ventilators is provided in the upper deck, four at each side door section. There are also two air intakes in the upper deck, one on each end of the car, located diagonally. The sliding end doors can be used to admit additional air when necessary. Drop windows, properly screened, in all six side doors, also contribute to adequate ventilation throughout the car.

The car is lighted with electric current from a 32-volt axle-lighting generator by means of seven center lamps, as well as a side light located at each door opening. The 16-cell storage batteries used in connection with the lighting equipment are of 200-amp.-hr. capacity, and carried in steel battery boxes lined with ⅜-in. poplar.

Westinghouse Schedule U. C. B. 2-14 brake equipment complete, with the American slack adjuster, is applied. The six-wheel trucks are equipped with clasp brakes. A geared handbrake is applied on the outside at one end of the car, arrangements being made so that this brake can also be operated from the inside of the car.

The trucks are of the six-wheel type with cast-steel side frames, with special equalizer springs and bolster springs, to promote easy riding of the cars. The journals are 5½ in. by 10 in., and the wheels, 37-in. rolled steel. Roller side bearings are of the 5½-in. single-roller type with a 2-in. pin. Cast steel couplers, with A. R. A. Type E head and bottom-operated uncoupling device, are used.

Double-End Gas-Electric Wrecking Crane

(Continued from page 710)

is 33 m.p.h. on level track or 13 m.p.h. on a 1.8 per cent grade. These speeds are with a 150-ton train.

The crane is equipped with New York Air Brake Company's type 14-EL locomotive equipment with two 18-in. by 12-in. brake cylinders, operating at passenger pressures.

The four travel motors on the trucks are General Electric, each rated at 160 hp.; two General Electric 135-hp. motors handle the main hoists, one motor for each boom. The control equipment is designed so that the crane may be operated only from one end at a time. The travel-motor controllers are G. E. series-parallel electro-pneumatic contactor type. G. E. reversing electro-pneumatic controllers handle the movements of the hoist motors. A General Electric CP-36 450-volt air compressor having 50 c. f. m. capacity furnishes air at 135 lb. reservoir pressure.

THE PENNSYLVANIA, beginning in April, will bring into New York daily, by a special train, 30 or 40 refrigerator cars from North Carolina, loaded with strawberries. This movement continues through the month of May. It appears that in the year 1930, the strawberries brought to the New York Terminals (including Newark and Jersey City) totaled 1,365 carloads, while the equivalent of 676 additional carloads came in by motor truck.

Communications and Books...

Taxation of Motor Vehicles

TO THE EDITOR:

CHICAGO.

If the discussion which has been vigorously carried on over the taxation of motor vehicles has developed anything at all, it has developed the need of a workable basis for determining fair and adequate rates of taxation. With the two-fold purpose of offering a tentative basis for determining fair and adequate tax rates and of stimulating further consideration of the subject, I present herewith the outline of a method which is based upon a study of highway costs and motor-vehicle tax payments in Illinois. The method here offered is based upon the primary assumptions that motor-vehicle taxes (1) should fully pay the annual cost (interest on investment, depreciation and maintenance) of the highway system, and (2) should be graduated according to the determining factor in highway costs, which is the gross weight imposed upon the highway.

The highway system of Illinois comprises the following mileage:

Concrete and other hard-surfaced roads.....	Miles 8,447
Gravel and macadam-surfaced roads.....	12,928
All other surfaced roads.....	75,912
Total	97,287

The estimated construction cost of this highway system, according to testimony given by Clifford Older, state highway engineer of Illinois, from 1917 to 1924, before the Interstate Commerce Commission in Docket 23400, is as follows:

8,447 miles hard-surfaced road.....@ \$31,200 per mile	\$263,546,400
12,928 miles gravel and macadam-surfaced road.....@ 15,800 per mile	204,262,400
75,912 miles other surfaced road.....@ 6,600 per mile	501,019,200
Total	\$968,828,000

The annual cost of the highway system is given by Mr. Older as follows:

Interest @ 4% on \$968,828,000.....	\$38,753,120
Amortization—concrete and other hard-surfaced only, based on 25-year life.....	3,716,680
Maintenance	21,796,092
	\$64,265,892

A substantial part of the construction and other costs of the Illinois highway system is chargeable to its use by heavy vehicles. If the hard-surfaced, gravel and macadam roads could have been constructed to sustain only the loads imposed by automobiles and other light vehicles—assuming for the purpose a maximum weight of approximately 6,000 lb. for such vehicles—the estimated cost of the system would have been as follows:

8,447 miles concrete and other hard-surfaced....@ \$22,200	\$187,523,400
12,928 miles gravel and macadam surfaced.....@ 12,300	159,014,400
75,912 miles all other surfaced.....@ 6,600	501,019,200
Total	\$847,557,000

The annual cost of such a highway system, used exclusively by light vehicles, would be as follows:

Interest @ 4% on \$847,557,000.....	\$33,902,280
Amortization—concrete and other hard-surfaced only, based on 25-year life.....	2,196,220
Maintenance	18,253,767
Total annual cost.....	\$54,352,267

The difference between the annual cost of the present highway system as designed and used, and its estimated cost if designed for and used exclusively by automobiles and other light vehicles, is \$9,913,625. Since this additional cost grows entirely out of the use of the roads by heavy vehicles, it should be borne entirely by such vehicles.

Motor vehicle registration in Illinois in 1929 was as follows:

Passenger automobiles.....	1,411,753
Trucks and buses.....	203,335
Total	1,615,088

As previously set forth, the additional annual cost of the highway system growing out of its use by heavy vehicles,

amounting to \$9,913,625, ought to be borne entirely by these vehicles. As a guide to the allocation of this increased cost, the following tabulation of truck weights according to capacity is presented:

Capacity	Weight	
	Empty	Loaded
¾ ton	4,075 lb.	5,575 lb.
1 ton	4,200 lb.	6,200 lb.
1½ tons	5,000 lb.	8,000 lb.
2 tons	7,000 lb.	11,000 lb.
2½ tons	7,500 lb.	12,500 lb.
3 tons	8,050 lb.	14,050 lb.
3½ tons	10,100 lb.	17,100 lb.
4 tons	10,850 lb.	18,850 lb.
5 tons	13,450 lb.	23,450 lb.
7½ tons	15,000 lb.	30,000 lb.
10 tons	20,000 lb.	40,000 lb.

Approximately 60 per cent of the trucks registered in Illinois have a capacity of one ton or less and thus come within about the same weight limits as automobiles. This leaves in the reckoning 40 per cent, or 81,334, of the 203,335 trucks registered in Illinois. However, it is estimated by Professor H. R. Trumbower, former economist of the United States Bureau of Public Roads, that one-half of all gasoline consumption is within cities, and on this basis one-half of the remaining 81,334 trucks never use rural highways. The remaining 40,667 trucks are therefore chargeable with the additional \$9,913,625 of annual highway cost, in addition to their proportion of the annual cost for a light-duty highway system. Therefore, the average payment by these trucks for the use of the highways should be:

$$\frac{\$9,913,625}{40,667} + \frac{\$54,352,267}{1,615,088} = \$278$$

Payments based upon this average of \$278 would be apportioned among the heavy trucks using the highway system on the basis of their ability to damage the highways. The ability of a truck to damage a rigid-surface highway goes back to the formula used in highway design. The generally accepted formula for rigid-pavement highway design is known as the Older formula.

$$\text{It is: } S = \frac{3P}{h^2}, \text{ where}$$

S = Maximum stress in pounds per square inch
P = Wheel load in pounds
h = Thickness of concrete in inches

From this formula, it is evident that ability to damage a rigid-surface road varies directly with the load; that is, a truck with a wheel load of 8,000 lb. damages the road twice as much as one with a wheel load of 4,000 lb.

The average capacity of all trucks produced in the United States and Canada in the seven years 1922-29 was 1.49 tons. Assuming that this is also the average capacity of all trucks registered in Illinois, the foregoing table of truck weights shows that 8,000 lb. is the load which the average Illinois truck imposes upon the highways. Applying this average poundage to the average truck tax payment of \$278, which was previously developed, gives 3½ cents as the annual tax per pound of load.

Applying this rate to trucks of other capacities, the tax therefore would be:

Tons capacity	Weight with load	Annual tax at 3½ cents per lb.
2 tons	11,000	\$385
2½ tons	12,500	438
3 tons	14,050	492
3½ tons	17,100	599
4 tons	18,850	660
5 tons	23,450	821
7½ tons	30,000	1,050
10 tons	40,000	1,400

The above figures represent total annual tax payments, including gasoline taxes and license fees, and are to be assessed only in the case of vehicles actually using the highways outside of cities. A similar method of calculation might be used to establish taxes for vehicles operated entirely within cities.

Assuming that a 3-ton truck travels 25,000 miles a year on rural highways and uses 5,000 gal. of gasoline, upon which a

tax of \$150 is paid, its license tax would be \$342 (\$492—\$150). The annual ton-mileage of this truck would be 175,625 and the annual license tax per ton-mile would be \$.00195, which is virtually equivalent to 1/5 cent. This compares with ¼ cent per ton-mile now assessed on common-carrier buses and trucks in Iowa.

The revenue derived by the state of Illinois from motor vehicles in 1929 totaled \$46,087,852—made up of \$18,447,247 in license fees and \$27,640,605 in gasoline taxes—compared with annual costs totaling \$64,265,892. Therefore, the users of the Illinois highways, as such, fell short of paying the annual cost of the Illinois highway system by \$18,178,040. This would be corrected by use of the method described above.

It is believed that this analysis provides a guide for setting up a fair, equitable and adequate system of motor vehicle taxation in Illinois, and that similar analyses of highway costs and motor vehicles used in other states would be of equal value to such states.

JAMES M. FARRIN,
Special Engineer, Illinois Central System.

Tell the Public the Story, Tell It Often and Tell It Well

GLEN ELLYN, ILL.

TO THE EDITOR:

I have read with much interest the many excellent editorials appearing in the *Railway Age* for several months in regard to the unfortunate position of the railways as a whole. I refer to the loss of traffic, subsidized competition and excessive taxation.

"Carrying coals to Newcastle" was never considered a virtue, and yet the limiting of the publication of these editorials to a periodical the circulation of which is largely confined to railroad officers and those of railway supply firms, is just that. One does not see the man in the street or the man on the farm reading the *Railway Age*, and those men are the ones who should be reached.

The railroads need help. The country needs the railroads. By and large they are the most efficient means of transportation yet developed. The average man owns an automobile because he can buy and use it. He can not buy a railroad if for no other reason than the fact that his backyard isn't big enough to hold it. He could not use it. Naturally such an average man thinks in terms of automobiles, hard roads, buses, trucks, etc. To him the local railroad is little more than a nuisance especially if it whistles at night. He can get around without it and thinks he wouldn't miss it. But he would.

Considering the capital investment in railroads the receiver-ship of a few large companies would cause a more sickly feeling in business and industry than that already existing. Few of the public seem interested in the railroad dilemma. The technical periodicals may have a little on railway needs but usually have much on additional concrete roads, waterways, etc. The newspapers have very little on the same subject. They will have more when it is too late. Nobody seems to love the railways. Perhaps they are too fat.

Your editorials should be published continuously and consistently in periodicals like the *Saturday Evening Post* and others. They should be written up in a style to make interesting reading and should be illustrated in so far as that is possible. Articles by railway officials published now and then are quickly forgotten. The public has too much to read. This is a job for an expert advertising man who understands the psychological value of constant repetition—repetition—repetition. No other way will get across.

You may say that the railroads do advertise extensively and some of them do but their advertising isn't exactly clever. It is not of the kind that gets over. Some of the tobacco "ads" have the railroad "copy" beaten before starting. Their copy writers know their business. They have the "punch."

The public likes to be told. The public can be told. The public has got to be told, and the sooner the better, that the railroads are here to stay for quite a while. Our prosperity depends on their prosperity. Why not tell them now?

WM. D. SHIPMAN.

New Books

Business Leadership, edited by Henry C. Metcalf. 357 pages, 8½ in. by 5½ in. Bound in cloth. Published by Isaac Pitman & Sons, 2 West Forty-fifth street, New York. Price \$3.

This is the fifth volume which has been edited by Dr. Metcalf for the series of works on business subjects, published under the general title "Business Management as a Profession." The series constitutes the records of annual courses of lectures in the Bureau of Personnel Administration, New York City, of which Dr. Metcalf is director.

The book takes the form of a symposium, which form Dr. Metcalf finds "has gained in general acceptance with the reading public because of its breadth of view." Contributions are included from 22 authorities and business experts who, as the description on the book's jacket aptly says, "view from all angles the urgent need for vision and leadership in the business world today and discuss in practical, helpful fashion the background and foundations for the necessary qualities of leadership, the objects to keep in view and the methods to consider in developing the leadership which business now demands."

Proceedings of the Air Brake Association.—T. L. Burton, secretary, Room 5605, Grand Central Terminal building, New York. 360 pages, 5 in. by 8½ in.

The proceedings of the thirty-seventh annual convention of the Air Brake Association held at Chicago, May 13, 14, 15 and 16, 1930, are bound in the usual manner in a black-leather covered book, lettered in gold. The various addresses and papers are printed in the order of their presentation. A paper on the Care of UC and Triple Valves While Out of Service was presented by the Southeastern Air Brake Club; The Relation of the American Railway Association Committee on Brakes and Brake Equipment to the Air Brake Association, by G. H. Wood; Operation of the Air-Pressure Water System on Sleeping and Passenger Cars, by the Central Air Brake Club; Brake Equipment for Gas Rail Cars, by the Pittsburgh Air Brake Club; Passenger-Train Handling, by J. H. Burke; Triple-Valve Repairs—Maintaining Standards by the Northwest Air Brake Club; Brake-System Leakage, by the St. Louis Air Brake Club; U-12-B Universal Valve, by the Manhattan Air Brake Club. Other reports were made on Recommended Practice and the Training and Supervision of Air-Brake Employees.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,
Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Apple Cart, by Bernard Shaw. Anything can result from a study of transport problems. For example see Shaw's preface to this play, pages xxxv-xlii, on the Gattie System of Transport (which was described in the *Railway Age*, Nov. 7, 1919, p. 922-923.) 118 p. Pub. by Brentano's New York City. \$2.00.

The Chicago, Burlington & Quincy Railroad Company, by Charles E. Fisher. "Originally financed and controlled by New England men, conservatively and safely managed, even through its entire history and to the present time, the early reports of this Company present an interesting picture to the student of early railroad history." p. 4. Illustrated with pictures of old locomotives and maps. 44 p. Pub. by Railway and Locomotive Historical Society, Inc., as its Bulletin No. 24, Boston, Mass. \$1 to members, \$2 to non-members.

Periodical Articles

A Look Ahead, by Floyd W. Parsons. "... let me attempt the difficult task of outlining probable developments in the decade now commencing." p. 18. "Hundred-passenger busses," "Bright prospects for Railroads," "Tank cars of the future,"

"An Air-minded generation," p. 146, 148. Saturday Evening Post, April 4, 1931, p. 18-19, 146-147, 148, 150.

Bill Cady of Laramie Has Learned to Move Ahead While Standing Still, by James Layfield. The career of the station-agent at Laramie, Wyoming. Illustrated. American Magazine, April 1931, p. 43-45, 151-152.

Les Chemins de Fer Allemands Depuis 1920, by Marcel Peschaud. "During these three periods the German railway administration has had to overcome grave difficulties, especially those of a financial order. We think that it will not be without interest to show what these difficulties have been and how they have been overcome. In this historical account it is possible to find useful lessons for other countries which are encountering among themselves serious problems in connection with their railroads." Translation, p. 343-344 Revue Politique et Parlementaire, March 10, 1931, p. 343-365.

Cities Must Give Railroads a Fair Break, by H. Van R. Chase. "... We forget that many American communities are the economic offspring of the railroads—brought into being by the two rails of steel which turned deserted wastes into farms and centers of commerce and industry..." Suggests local studies of transportation requirements and facilities looking to coordination. Nation's Business, April 1931, p. 52, 54, 56.

The Cross-State Railroad Issue, by Donald M. Erb. "... It [the proposed Crane-Crescent line] is important locally because it throws into sharp relief many of the basic economic problems of Oregon; it is important nationally, because it makes an issue of an uncertain point in our interstate regulatory legislation." p. 10. Commonwealth Review [University of Oregon], March 1931, p. 10-18.

Documents de Base Utilisés par les Chemins de Fer du Midi pour l'Elaboration des Statistiques Commerciales, by Rasclé. Forms and methods adopted to secure necessary statistics. Illustrated. Revue Générale des Chemins de Fer, March 1931, p. 323-331.

The Eyes and Ears of the Railroad, by Francis X. Milholland. Modern signaling with special reference to the Baltimore & Ohio, and Washington Terminal. Illustrated. Scientific American, April 1931, p. 224-230.

Future of New England Roads, by William Z. Ripley. Discussion of the four-system plan for eastern railroad consolidation and an analysis of the "Rhode Island plan." Savings Bank Journal, April 1931, p. 15-18, 62-64.

The Growth in the Relative Importance of the Large Corporation in American Economic Life, by Gardiner C. Means. Table IIb lists 45 railroads in the list of the 200 largest companies in 1919 and 1927, p. 40. American Economic Review, March, 1931, p. 10-42.

Les Horaires 1931-32. Summary of proceedings of the International Time-Table Conference with changes in passenger train services in various parts of Europe. Revue Générale des Chemins de Fer, March 1931, p. 342-345.

The Right to Drive, by Richard Shelton Kirby. "... The fact is, however, that American automobiles are responsible each year for direct property damage of the value of two hundred millions of dollars—more than half the initial cost of our boasted Panama Canal; and if all economic losses are included the total approximates a billion dollars. Can this be even one of the least of the numberless causes of our present economic depression?" p. 439. Atlantic Monthly, April 1931, p. 438-444.

The Second Industrial Revolution, by H. Stanley Jevons. "The thesis of this article is that the advanced industrial countries of the world are now in the first stage of a sweeping change of the methods and organization of all their secondary industries..." The essence of the new industrial revolution is the search for exact knowledge and the planning of processes..." p. 1. Economic Journal, March 1931, p. 1-18.

La Seconde Révolution Industrielle, by Edmond Landauer. Another consideration of economic changes. Revue Économique Internationale, February 1931, p. 221-225.

When Locomotives Go to Sea. How they are loaded and shipped. Scientific American, April 1931, p. 253 and cover.

Looking Backward . . .

Fifty Years Ago

Under the title of the New York, Chicago & St. Louis have been consolidated the Buffalo, Cleveland & Chicago, the New York & Pennsylvania and the New York & Chicago. Capital stock of the new company is fixed at \$35,000,000, of which \$11,000,000 is 7 per cent preferred stock. This road, when completed, will provide a continuous line from Buffalo, N. Y., via Erie City, Pa., Cleveland, Ohio, and Fort Wayne, Ind. to Chicago, the whole distance to be made by passengers without change of cars. A number of construction contracts for the linking of these roads into a through route have been awarded.—*Railway Age*, April 14, 1881.

The colossal manufacturing establishment at Pullman, 13 miles south of Chicago on the Illinois Central, was informally given life last Saturday [April 2, 1881] by the starting of the mechanism of its vital center, the gigantic Corliss engine of Centennial fame which cost \$125,000 to build. A large party made up of Chicago's leading mercantile and railroad lights went down by special train to witness the ceremony. George M. and A. B. Pullman received the party in person and conducted them directly to the great engine room where George M. Pullman's 13-year old daughter composedly turned the valves admitting steam to the Corliss engine.—*Chicago Railway Review*, April 9, 1881.

The sale of the interests of Col. Thomas A. Scott in the Texas & Pacific and the New Orleans Pacific [now part of the former] to Jay Gould, and the election of the latter to the presidency, is an important step toward the consolidation of the southwestern roads. Mr. Gould and his associates now virtually control the Missouri Pacific, including the Missouri, Kansas & Texas, the International & Great Northern, the St. Louis, Iron Mountain & Southern [now part of the Missouri Pacific], the Houston & Texas Central [now part of the Southern Pacific], the Texas & Pacific, the New Orleans Pacific, and doubtless the Vicksburg, Shreveport & Pacific [now part of the Illinois Central].—*Railway Age*, April 14, 1881.

Twenty-Five Years Ago

E. H. Fritch, assistant secretary of the American Railway Engineering and Maintenance of Way Association, has been elected secretary of that organization.—*Railway Age*, April 13, 1906.

T. T. Irving, resident engineer of the Grand Trunk at Detroit, Mich., has had his jurisdiction extended over the bridge and building department at that point.—*Railway and Engineering Review*, April 14, 1906.

Ten Years Ago

President Harding and members of his cabinet are still earnestly studying the railroad problem, trying to find a way by which transportation costs may be reduced and by which bankruptcy for the railroads may be averted, but have thus far found no plan on which he is ready to act and he does not propose to dictate or interfere with the functions of either the Interstate Commerce Commission or the Railroad Labor Board.—*Railway Age*, April 11, 1921.

A recent compilation shows that the Canadian government's investment in railway property is \$2,284,125,057. A former comptroller of statistics of the Canadian Department of Railways and Canals states that the deficit of the government railways during the current year will exceed \$136,000,000, after allowing a deduction of \$5,000,000 for net earnings by the Grand Trunk. This amount is equal to one-third of the Dominion's revenues from taxes.—*Railway Age*, April 8, 1921.

Odds and Ends . . .

Tenth Omaha Station

The new union passenger terminal at Omaha, Nebr., is the tenth passenger station at that point which the Union Pacific has built or helped to build. This must be practically the record, at least for stations west of the Mississippi river.

This Pen Holder is 30 Years Old

TO THE EDITOR:

Believe it or not—I am still using a pen holder that I acquired with the El Paso & Southwestern at Hachita, N. M., in 1901.

A. S. BISHOP,
Chief Dispatcher, Rock Island Lines.

FAIRBURY, NEB.

More Gages

Since writing the small treatise on railway gages throughout the world, which appeared in the issue of February 21, we have discovered that, on the Ceylon Government Railways, there are 735 miles of 5 ft. 6 in. gage, and 117 miles of 2 ft. 6 in. gage.

Model-Building Articles

H. J. Coventry, who designed and supervised the construction of the master models of locomotives for the Baltimore & Ohio centenary exhibition, is running an interesting series of articles on locomotive model building in the B. & O. magazine, beginning with the March issue.

Record Pass Collector

When George L. A. Thompson, division passenger agent of the Pennsylvania at Cincinnati, Ohio, retired on March 1, it was discovered that he had retained a collection of every annual pass issued to him during his 49 years of railway service. The collection represents a stack of passes considerably over a foot high, and Mr. Thompson is of the opinion that there are few larger collections.

Noble Stork Visits Train

A daughter was born to Princess Marie Gabriele Hohenzollern Oeringen of Germany in a sleeping car of an express train, as she was being rushed to a Berlin hospital. Mother and child were taken to a hospital when they arrived in Berlin and were reported doing well. Dr. Alfred Loeser, who was aboard the train, revealed that he forgot to pull the emergency signal and stop the train, and that the baby entered the world while the train was dashing at full speed.

A Flood of Johnsons

The Smiths, popularly supposed to predominate in telephone and city directories, can hardly be said to be in the ascendancy among railway men. Nor are the Joneses at the top. The Johnsons lead the list in "Who's Who in Railroad-ing" with 34 names. The Smiths are second with 32. There were only 13 Jones. There are 27 Browns, 18 Clarks, 17 Williams, 15 Woods, 13 Adams, a like number of Whites and 11 Andersons. Among the names that stand out in the history of pioneer railroad-ing, there are nine Hills, one Hariman, three Goulds, and five Baldwins.

Pullman History

The Pullman magazine has delved into history and discovered the reason for George M. Pullman coming West. It seems that Pullman was employed in a harness shop at Barcelona Harbor, N. Y., on the shore of Lake Erie, as an apprentice. One morning a terrible storm blew up and when the harnessmaker went to visit his shop, he discovered that it had been washed out into Lake Erie. He then moved to

Westfield, N. Y., and built another shop, but Pullman decided that he had had enough of the East and came on to Chicago to found the world-wide business which now bears his name.

Mr. Appleton Tells Tales

J. A. Appleton, general superintendent of the Pennsylvania at Chicago, is puzzling over what to do in the case of the foreigner who left his suitcase in front of the information bureau at the Union station and went away for a few moments, returning to find his suitcase missing. The lad's angry complaint as relayed to Mr. Appleton was:

"Pretty dam seldom when my suitcase she no fly away. You no more fit to keep station than for Pete's sake. That's all I hope."

Mr. Appleton, who is from New York, but who spent a year or two in Pennsylvania communities before going West, recalls samples of Pennsylvania Dutch dialect. There was the little boy who wanted to know if the caboose was at the end of the train. He asked his mother about it.

"When the little red house makes by, the train's all, ain't mom?" he queried.

"Puffing Billies"

The Interborough Rapid Transit Company of New York has just sold two of its four remaining steam locomotives, that formerly chugged their way about on the elevated structures. The sale of these locomotives adds another interesting chapter to the record of what has happened to the 340 engines that were retired from Manhattan service when the lines were electrified a number of years ago. Only two of these veterans, No. 295 and No. 137, are now left. All the rest of these engines that used to puff up and down the Manhattan lines have seen varied service since they became obsolete for rapid transit in New York. They have literally gone to every part of the world to be used in mining camps, in lumber operations, etc. The records show that some saw service during the Russo-Japanese War. For more peaceful industrial purposes this collection of "old timers" has seen service in Mexico, India, Africa and a number of countries in South America. In recent years, rapid progress in electric transmission has slowed up the demand for such equipment.

Oldest General Office Building?

The illustration shows what is believed to be the oldest railway general office building in the world. It was built 96 years ago at Woodville, La., to accommodate the general offices and the bank belonging to the West Feliciana Railroad. This company, which was incorporated on March 25, 1831, is now a part of the Illinois Central system.



The Former Headquarters of the West Feliciana Railroad

NEWS

N. Y. Roads Arranging Conferences on Collection and Delivery Plan

Arrangements are being made by railroads serving New York City for early conferences with representatives of shippers and trucking interests to discuss a plan whereby the Railway Express Agency would make available to patrons of all New York carriers a direct collection and delivery service for carload freight. The plan, as evolved by the committee of railway operating and traffic executives, headed by R. N. Collyer, chairman, Traffic Executive Association, Eastern Territory, contemplates the installation of the Express Agency trucking service in the four New York City boroughs of Manhattan, Brooklyn, Queens and the Bronx. Under the proposed plan the Railway Express Agency would hold itself out to provide direct collection and delivery of carload freight under a schedule of charges which would correspond to existing New York City trucking rates for comparable services.

The committee of operating and traffic officers, as pointed out in the outline of developments in the case published in the *Railway Age* of April 4, page 689, has been studying this New York situation for several months. When its proposals were recently formulated, this committee recommended that the plan be made the subject of conferences with interested parties. Accordingly the committee was empowered to hold such conferences preliminary to submitting the plan for final approval. Among those who will be invited to participate in the conferences will be the Atlantic States Shippers' Advisory Board, the Shippers' Conference of Greater New York and the New York Board of Trade and Transportation, organizations which have been urging the carriers to act more promptly in the matter.

Rock Island Group Insurance Benefits

A total of \$3,218,250 was distributed to employees of the Chicago, Rock Island & Pacific and their families from May 1, 1926, to December 31, 1930, through the Metropolitan Group Insurance which is in force on the Rock Island lines. This disbursement covered a total of 17,204 claims during that period and averaged \$57,000 per month. The claims included \$884,549 for 15,813 claims for health and non-occupational accident benefits, \$38,000 for 49 dismemberments, \$75,229 for 167 total and permanent disability benefits, \$1,923,471 for 1,035 deaths from natural causes, and \$297,000 for 140 deaths from violent and accidental means.

Grade crossing eliminations, which practically speaking confer little or no benefit upon the railroads, are nevertheless costing the rail lines of this country about \$30,000,000 a year, or, in other words, are eating up the equivalent of the interest on \$600,000,000 of capital. This is something else which the American public might well think about seriously, especially in view of the fact that, taken in connection with the heavy taxation of the railroads, it seems to create a most inequitable situation, and further limits the capacity of the railroads to make productive improvements.

—From an address by Elisha Lee, Vice-President Penn. R. R. at Harrisburg, Pa.

F. Ringer Heads Joint Committee on Grade Crossing Protection

F. Ringer, chief engineer of the Missouri-Kansas-Texas, has been appointed chairman of the Joint Committee on Highway Grade Crossing Protection of the American Railway Association, succeeding the late W. J. Towne.

Southern Roads Oppose Reduction on California Sugar

The southern railways have added their support to the position taken by the eastern lines and the Inland Waterways Corporation in opposing the application of the western transcontinental railways for authority to reduce the rate on sugar from California to St. Louis, Chicago and Milwaukee from 84 to 67½ and 65 cents per 100 lb., without making corresponding reductions to intermediate points, in order to meet the competition of water lines. The southern roads, in their brief, take the position that sufficient effect has already been given to the competitive situation existing at the points named and that the rail rates from California are already depressed. They assert that to reduce them further will only bring about widespread reductions in all-rail freight rates from other competitive points, with consequent losses in revenue to all carriers concerned and without any material advantage to the transcontinental lines; and that, while there is a substantial movement of sugar by water, the principal movement from the Pacific coast is all-rail.

Increased Divisions Recommended for Western Trunk Lines

An increased basis of divisions for the western trunk line railroads out of the joint freight rates between western trunk line territory and trans-Missouri and Montana territory is recommended in a proposed report by Examiner W. A. Disque, of the Interstate Commerce Commission, in connection with an investigation of the reasonableness of the present divisions. He recommends a finding that the present divisions of joint rates applying between western trunk line and transcontinental territories are reasonable and otherwise lawful but that the divisions between western trunk line territory and trans-Missouri territory are unreasonable; and that to correct the situation they should be revised on the basis of a weighted average mileage pro-rate in which the actual distances west of the gateways have been constructively inflated 15 per cent. On traffic to and from Montana via the Minnesota gateways the report recommends that the actual distance west of the gateways be constructively inflated 14 per cent.

The commission had previously required a readjustment of the divisions between the western trunk lines and the southwestern lines so as to give the western trunk lines an increase of approximately 9 per cent, or about \$3,000,000 a year, and an agreement was reached between the railroads themselves, with the aid of the commission's examiner, as to the divisions of transcontinental rates, which has yielded the western trunk lines an increase of over \$3,000,000 a year. An agreement was also reached several years ago as to the trans-Missouri divisions which gave the western trunk lines an increase of approximately \$2,000,000 a year, but the trunk lines indicated that they were dissatisfied and asked a review of the divisions by the commission.

The present divisions are on various bases. The report states that they happen to yield the western trunk lines considerably less and the trans-Missouri lines considerably more than a weighted average mileage pro-rate. Seven of the western trunk lines, the Chicago & Alton, the Chicago & Eastern Illinois, the Chicago and North Western, the Chicago Great Western, the Chicago, Milwaukee, St. Paul & Pacific, the Minneapolis & St. Louis and the Wabash, designated in the report as complainants, asked that the divisions be readjusted on the basis of a mileage pro-rate. The report refers to these lines as "rather weak," but no estimate is given as to the amount of the increased revenue expected to result from the readjustment.

The lines opposing the complaints, referred to as "generally in somewhat better financial condition," were said to have sought "only to hold what they have." Oral argument on the report will be heard by the commission on June 10 and 11.

Railway Fire Protection Association

The executive committee of the Railway Fire Protection Association has voted to have the annual meeting of the Association held in Cleveland, Ohio, on Tuesday, Wednesday and Thursday, October 20, 21 and 22.

Bridge Companies and I. C. Law

The Interstate Commerce Commission has announced a series of hearings in connection with its investigation as to the application of the recapture and security regulation provisions of the interstate commerce act to bridge companies, to be held before C. V. Burnside, assistant director of its Bureau of Finance, at Washington on April 20, Chicago on April 22 and St. Louis on April 24.

Low Fares to Colorado and Black Hills

Railroads operating from Chicago to Colorado and the Black hills of South Dakota will establish low round-trip fares on July 1 and 15, and August 1 and 15. The rate to Denver and to Colorado Springs will be \$30 which is \$13 less than the summer excursion fare. The tickets will have a 15-day return limit. The round-trip fare from Chicago to the Black hills will be \$25 with the same limit.

Traffic Men at Cincinnati April 14

The Central Passenger Association, the Southwestern Passenger Association and the Southeastern Passenger Association have decided to hold their April meetings at Cincinnati, Ohio, on April 14 and 15. At the same time, committees from the various territories, including the New England, the Trunk Line, the Central, the Southeastern, the Southwestern, the Transcontinental and the Western will meet to discuss matters of general interest, including convention rates.

A Twelve-thousand-ton Train

Freight train AC-10 of the Pennsylvania, 120 cars, leaving Enola, Pa., on March 8, was run to North Point (over the Maryland division) a distance of 72.9 miles at a speed, actual running time, of 19.88 miles an hour, said to be the best record on this division, the weight of the train being 12,035 tons. The train was hauled by locomotives 611 and 1269. The actual time for the distance given was four hours, 40 minutes, the delays in making two meets and taking water twice causing aggregate delays of one hour.

Tri-City Traffic Club

The Tri-city Traffic Club (Davenport, Iowa, Rock Island, Ill., and Moline) has elected the following officers for the ensuing year: President, F. M. Goddard, traffic manager of the Bettendorf Company, Davenport, Iowa; vice-presidents,

F. C. Hall, agent of the Chicago, Rock Island & Pacific at Moline, Ill.; William Biggs, agent of the Chicago, Milwaukee, St. Paul & Pacific at Rock Island, Ill.; and M. J. Gorman, agent of the Chicago, Burlington & Quincy at Davenport; and secretary-treasurer, A. J. Christiansen, traffic manager of the Moline Association of Commerce.

Bucyrus Shops Litigation

The City of Bucyrus (Ohio) has been granted a temporary injunction enjoining the New York Central from removing its shops in that city to Collinwood, Ohio, near Cleveland. The city contends that it gave the railroad the ground on which its shop buildings now stand with the stipulation that buildings and equipment would revert to the city if the railroad should ever abandon them. Evidence produced at the court hearing showed that in 1880 the Ohio legislature enacted a statute giving a city the right to enter into such a contract with any railroad or industrial concern.

Train-Wrecker Confesses

A discharged section hand has confessed that he caused the derailment of a St. Louis-San Francisco passenger train at Henryetta, Okla., on August 18, 1929, when 13 passengers were killed. The culprit, was apprehended by railroad and city police at Parsons, Kan., on April 5 and was brought to Henryetta, where he confessed and pleaded guilty to a murder charge. He said he became enraged when he was discharged and "cocked" a switch on the out-skirts of Henryetta about the time he expected a freight train to pass, thinking it would jump the track and the foreman who discharged him would be blamed.

Halifax Wants the C.P.R.

The Nova Scotia Legislature last week unanimously declared its belief that entry of the Canadian Pacific Railway is essential for the satisfactory growth of the province, and that the C.P.R. should be given running rights over the Intercolonial line into Halifax, "on an equitable basis with other railway systems entering this province over the said lines."

In moving the resolution, which received the spoken support of both Government and Opposition, Premier Gordon Harrington remarked that Halifax had been developed along the lines of a national port. In location it was pre-eminent as a connection with the United Kingdom.

Material Handling and Office Equipment Exposition

The products and equipment of approximately 80 manufacturers of material-handling and office equipment will be exhibited at the Cleveland, Ohio, auditorium, April 13 to 18, inclusive, according to the latest announcements of the National Equipment Exposition. This exposition is being held in connection with the National Material Handling and Management Congress and will display equipment used on railroads, as well as in industrial plants. The exhibit-

ors will include the following manufacturers of tractor and lift truck equipment: Baker-Raulang Company, Barrett Cravens Company, Elwell-Parker Electric Company, Lewis Shepard Company and Mercury Manufacturing Company.

International Conference on Bituminous Coal

The Carnegie Institute of Technology announces that a third International Conference on Bituminous Coal will be held at Pittsburgh, November 16 to 21, 1931. The purpose of the congress is similar to that held in 1926 and 1928: To present for discussion the results of recent studies of coal, emphasizing improved methods of utilization and their economic value.

The program will include papers on the carbonization, liquefaction and gasification of coal. An invitation is extended to all scientists of all countries to attend and take part in the conference. It is requested that fuel technologists who wish to contribute papers to the conference apply to the secretary at Carnegie Institute of Technology as early as possible as the program is rapidly being compiled.

New York State Labor Law

The New York Supreme Court, at Albany, on April 4, granted the injunctions asked for by the Long Island and the Delaware, Lackawanna & Western, against the State Department of Labor, forbidding the application of the Dunmore Act in cases where a railroad does work on railroad crossing eliminations by the use of its own forces. This makes no change in the ruling of the same court, last December, sustaining the Dunmore Act, requiring the application of the eight-hour law and the prevailing rate of wages rule, to contracts covering work on grade crossings. The law is held valid except where it conflicts with the Federal law; and the court finds that there is such conflict when the state attempts to regulate the hours or wages of railroad employees; these being features of railroad operation concerning which Congress has taken action.

Freight Claim Payments

Freight claims paid in 1930 by the Class I railroads for loss and damage of freight totaled \$34,974,056, according to reports compiled by the Freight Claim Division of the American Railway Association. This was the smallest sum reported for any year since 1916 and was a reduction of \$1,139,847 or 3.2 per cent under 1929. On the basis of the total number of cars loaded with revenue freight, however, this total averaged 78 cents a car, compared with 68 cents in 1929. For the five years ended with 1930, there has been a reduction of \$5,446,715 or 18.2 per cent in the amount of loss and damage claims paid on all commodities except fresh fruits, melons and vegetables. At the same time there has been an increase of \$3,499,040 in the amount of loss and damage on fresh fruits, melons and vegetables for the same period. The railroads in 1930 received 2,417,110 claims growing out of loss and damage to freight shipments, which was a reduction of eight per

cent under the number received in 1929. Of the total number received, 75.7 per cent were either paid, declined or withdrawn within 30 days, while 15.5 per cent were adjusted between 30 and 90 days after receipt.

Ohio Trucking Certificate Denied New York Central

The Ohio Supreme Court in a recent decision upheld the Public Utilities Commission of that State in the latter's denial of a certificate of convenience and necessity to the New York Central for the operation of motor trucks for the handling of freight between Cleveland, Toledo and Danbury and intermediate points.

This case, which has been before the Ohio commission and courts for some time, grows out of the contract which the New York Central entered in 1925 with the A. B. Peek Company under which the latter agreed to handle l. c. l. freight by motor truck from station to station in lieu of rail service over the route involved. Developments in the case prior to the present decision were summarized in the Motor Transport Section of the *Railway Age* of December 27, 1930, page 1422.

Kirkland, Managing Editor of Railway Purchases and Stores, Dies

Harry B. Kirkland, managing editor of *Railway Purchases and Stores*, Chicago, for the past 10 years, died at his home at Evanston, Ill., on April 3 after a week's illness induced by a paralytic stroke.

Mr. Kirkland, who was 49 years of age, was born at Bartlett, Ill., and attended the Janesville (Wis.) High school and the University of Wisconsin. His experience included railroad location and construction and industrial construction. During 1906, 1907 and 1908 he was engaged in the construction of a copper smelter in Peru, and following this he served as engineer for a contractor on reinforced concrete bridge construction.

From 1910 to 1913 he was associate editor of *Engineering and Contracting* at Chicago and for a number of years following he devoted his time to the development of machinery for the placing of concrete tunnel linings pneumatically. During the World war he served as a captain in the Quartermaster corps, Construction division, United States Army, in charge of the construction of ordnance plants. Mr. Kirkland became managing editor of *Railway Purchases and Stores* in 1920.

Associated Traffic Clubs

The semi-annual meeting of the Associated Traffic Clubs of America will be held at the Palmer House, Chicago, on May 6 and 7. The main subject to be discussed will be "A National Transportation Problem," views on which will be presented by speakers representing the shippers, the railroads, highway transport, the inter-coastal steamships and the inland waterways. W. H. Day, president of the National Industrial Traffic League, will represent the shippers; Carl R. Gray, president of the Union Pacific, and Paul

Shoup, president of the Southern Pacific, will speak for the railroads; H. B. Walker, president of the American Steamship Owners' Association, for the steamships; and General T. Q. Ashburn, chairman of the Inland Waterways Corporation, for the inland waterways; while Howard C. Kidd, professor of transportation at the University of Pittsburgh, will speak on "One Phase of a Program of Regulation"; and Theodore R. Dahl, vice-president of the White Motor Company, on "Highway Transportation." W. E. Butterbaugh, professor of transportation at the University of Minnesota, will speak on the recent industrial traffic management survey made by the United States Department of Commerce.

French Railway Officers Here

A group of French railway officers, arriving here recently for a study of railway conditions in North America, commenced their investigations on April 8, as guests of George Le Boutillier, vice-president of the Pennsylvania, on a tour of inspection of Pennsylvania facilities around New York City.

In the French delegation are the following officers of the Northern of France: Robert Le Besnerais, assistant vice-president of traffic; Paul Chaperon, assistant general manager; Aime Place, general superintendent; Jean Lancrenon, assistant general superintendent; Hyacinthe Servonnet, assistant general superintendent of motive power; Louis Cambournac, engineer maintenance of ways and Maurice Lemaire, engineer maintenance of ways. The French State

The economic question underlying these transportation developments (highway, waterway, airway, pipe line, electric power line) goes much deeper than their effect on the railways. Are the developments economically sound? Will they, continued over the next half-century, assure the nation that adequacy and efficiency of transportation service that is its due? Will the problem gradually expand into a fight to the finish among the several transport agencies, or will it approach solution through an orderly and intelligent process of co-ordination and adjustment? These are searching questions, but they call for study, and should receive thoughtful attention from engineers, economists, transportation men in all fields, public administrators, and business leaders. Otherwise, we may be headed for a period of economic readjustment that will create more problems than we can now foresee. Shall we drift into and through this period without a rudder, or is there a guiding hand to steer the transportation bark safely through these troubled waters?

—Dr. Julius H. Parmelee,
in *Mechanical Engineering*

Railways are represented by: Frederic Surleau, assistant vice-president, operating department; Jean Levy, general assistant superintendent; Jean Girette, general district superintendent of traffic; and Henri Pacon, superintendent of buildings.

The delegation will visit Philadelphia on April 13, and from there will proceed west for visits to Chicago, St. Louis, and other points. In the course of their studies they will also visit Washington, D. C., Canada, and New England, returning to France during the latter part of May.

James Bay Line Nears Completion

Ontario's first and only seaport will become a reality in August this year when the Temiskaming & Northern Ontario completes its line to James Bay, the south extension of Hudson Bay at Moose Factory. At that time, this 200-year old trading post will be brought into civilized modernity and a commencement made at establishing what is expected to be an important industrial center of the province.

With the advent of the railway, the T.N.O. Commission will immediately start building a new town and establishing the facilities that will be required for terminal purposes. An 800-acre tract of land will be cleared and arrangements made for the installing of the necessary sanitation facilities. The main building program, other than for structures that will be required by the railway will not be instituted for a year, but then an extensive program of a permanent nature will be commenced.

A feature of the layout will be an Indian encampment, equipped with all sanitation needs, to be founded directly north of the town site. This will be six or eight acres in extent and will be for the exclusive use of the Indians resident in the locality.

Chairman Lee of the T.N.O. Railway Commission spoke enthusiastically at North Bay last week of the possibilities that lay before the creating of this outlet to sub-Arctic waters.

"We are not concerned with oceanic traffic at this time; just now we are concentrating wholly on business possibilities and industrial expansion in and around James Bay," he said. Moose Factory will command 3,000 miles of shore line and draw on all the resources so bounded.

Parliament Discusses C.N.R.

Already in the Canadian Parliament the Canadian National has furnished material for a good-sized debate. Last week in the House, just before the adjournment for the Easter holiday Premier Bennett brought in a supplementary estimate for the Canadian National, for the fiscal year just ended, of \$11,410,400. There was asked for, in addition, \$434,210 on account of the operating deficit of the Canadian Government Merchant Marine in the calendar year of 1930, \$122,730 on account of the deficit in the Canadian National-West Indies steamship service, and \$1,726,666 as an additional amount required to provide for the payment to the C.N.R.

(Continued on page 736)

Revenues and Expenses of Railways

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1931

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income	Net operating income, 1930.
		Freight	Passenger	Total	Way and structures	Maintenance of equipment	Trans- portation					
Akron, Canton & Youngstown.....Feb. 171		\$148,587	\$74	\$148,661	\$17,817	\$16,158	\$12,862	68.9	\$10,857	\$10,857	\$10,857	\$10,857
Atchison, Topeka & Santa Fe.....Feb. 9,649		8,201,433	1,890,038	10,091,471	1,473,970	2,746,670	3,785,091	89.7	8,435,999	8,435,999	8,435,999	8,435,999
Atchison, Topeka & Santa Fe.....Feb. 9,649		17,303,688	3,970,351	21,274,039	2,995,424	5,709,756	8,161,651	89.7	18,496,968	18,496,968	18,496,968	18,496,968
Gulf, Colorado & Santa Fe.....Feb. 1,976		1,091,106	88,301	1,179,407	234,805	320,971	57,284	93.6	77,512	77,512	77,512	77,512
Panhandle & Santa Fe.....Feb. 1,726		2,271,767	180,572	2,452,339	463,086	684,936	1,065,762	94.4	155,262	155,262	155,262	155,262
Panhandle & Santa Fe.....Feb. 1,726		626,566	66,151	692,717	130,643	207,459	41,584	89.7	77,250	77,250	77,250	77,250
Panhandle & Santa Fe.....Feb. 1,722		1,366,633	135,055	1,501,688	278,265	423,869	590,737	86.4	79,162	79,162	79,162	79,162
Atlanta & West Point.....Feb. 93		107,307	31,710	139,017	20,475	32,835	69,607	93.0	11,803	11,803	11,803	11,803
Western of Alabama.....Feb. 133		299,486	64,432	363,918	44,398	66,903	139,859	95.4	31,595	31,595	31,595	31,595
Western of Alabama.....Feb. 133		122,796	34,061	156,857	29,218	39,720	62,447	90.0	17,591	17,591	17,591	17,591
Western of Alabama.....Feb. 133		236,103	67,730	303,833	57,247	82,721	130,105	95.1	24,478	24,478	24,478	24,478
Atlanta, Birmingham & Coast.....Feb. 639		230,624	9,181	239,805	67,037	65,375	136,692	119.8	18,402	18,402	18,402	18,402
Atlantic Coast Line.....Feb. 5,161		476,828	20,655	497,483	145,291	141,643	283,604	121.6	38,606	38,606	38,606	38,606
Atlantic Coast Line.....Feb. 5,161		416,166	1,295,576	1,711,742	692,522	944,700	1,851,148	64.8	177,044	177,044	177,044	177,044
Atlantic Coast Line.....Feb. 5,161		8,267,946	2,363,817	10,631,763	1,430,192	1,989,315	3,839,377	69.1	3,609,759	3,609,759	3,609,759	3,609,759
Charleston & Western Carolina.....Feb. 342		179,397	4,398	183,795	35,146	30,273	78,465	82.2	6,315	6,315	6,315	6,315
Baltimore & Ohio.....Feb. 5,653		372,737	9,589	382,326	1,237,097	1,414,784	486,248	86.6	1,416,368	1,416,368	1,416,368	1,416,368
Baltimore & Ohio.....Feb. 5,653		10,476,403	2,492,792	12,969,195	2,621,667	6,598,727	10,649,815	84.8	22,550,079	22,550,079	22,550,079	22,550,079
Baltimore & Ohio.....Feb. 5,653		22,404,106	2,492,792	24,896,898	2,621,667	6,598,727	10,649,815	84.8	4,052,113	4,052,113	4,052,113	4,052,113
Baltimore & Ohio.....Feb. 85		247,133	30,968	21,998	90.3	22,823	22,823	22,823	22,823
Staten Island Rapid Transit.....Feb. 23		50,249	65,711	4,554	92.7	40,918	40,918	40,918	40,918
Staten Island Rapid Transit.....Feb. 23		161,415	6,820	1,860	77.5	15,450	15,450	15,450	15,450
Staten Island Rapid Transit.....Feb. 23		331,802	27,053	187,730	80.2	31,658	31,658	31,658	31,658
Bangor & Aroostook.....Feb. 619		695,780	54,557	750,337	112,988	109,911	174,093	55.6	26,478	26,478	26,478	26,478
Belt Ry. Co. of Chicago.....Feb. 53		1,584,485	260,133	10,398	58.8	53,133	53,133	53,133	53,133
Belt Ry. Co. of Chicago.....Feb. 53		420,431	38,653	219,122	69.4	9,156	9,156	9,156	9,156
Belt Ry. Co. of Chicago.....Feb. 53		896,640	43,104	442,114	65.6	18,767	18,767	18,767	18,767
Bessemer & Lake Erie.....Feb. 227		410,710	3,031	413,741	426,603	269,067	183,649	131.2	37,201	37,201	37,201	37,201
Bingham & Garfield.....Feb. 33		829,937	6,603	836,540	109,687	57,866	383,920	135.7	75,017	75,017	75,017	75,017
Bingham & Garfield.....Feb. 33		23,028	.....	23,028	6,128	7,501	6,803	110.7	4,324	4,324	4,324	4,324
Bingham & Garfield.....Feb. 33		48,245	.....	48,245	12,047	12,042	14,436	101.8	8,528	8,528	8,528	8,528
Boston & Maine.....Feb. 2,089		3,152,786	1,024,346	4,177,132	664,195	698,878	1,828,213	73.3	227,315	227,315	227,315	227,315
Brooklyn Eastern Dist. Term.....Feb. 11		6,393,715	2,113,224	8,506,939	1,408,773	1,389,071	3,844,880	74.7	4,684,430	4,684,430	4,684,430	4,684,430
Brooklyn Eastern Dist. Term.....Feb. 11		98,353	.....	98,353	9,752	8,761	54,281	54.5	5,281	5,281	5,281	5,281
Brooklyn Eastern Dist. Term.....Feb. 11		196,438	.....	196,438	19,065	18,780	62,663	56.8	11,713	11,713	11,713	11,713
Buffalo & Susquehanna.....Feb. 253		112,680	460	113,140	25,375	36,812	39,075	89.1	6,830	6,830	6,830	6,830
Buffalo, Rochester & Pittsburgh.....Feb. 601		236,032	1,036	237,068	258,328	76,631	82,740	89.4	14,563	14,563	14,563	14,563
Buffalo, Rochester & Pittsburgh.....Feb. 601		945,513	37,904	983,417	1,016,168	298,969	428,690	90.4	40,243	40,243	40,243	40,243
Buffalo, Rochester & Pittsburgh.....Feb. 601		1,927,766	85,376	2,013,142	261,441	594,237	905,036	92.0	82,792	82,792	82,792	82,792
Burlington-Rock Island.....Feb. 367		83,846	2,489	86,335	92,697	17,652	54,757	121.3	10,137	10,137	10,137	10,137
Canadian Pacific Lines in Maine.....Feb. 233		234,029	22,054	256,083	12,641	34,639	116,158	103.3	23,262	23,262	23,262	23,262
Canadian Pacific Lines in Maine.....Feb. 233		443,210	46,615	489,825	7,804	62,578	109,324	71.2	4,023	4,023	4,023	4,023
Canadian Pacific Lines in Maine.....Feb. 233		42,692	15,297	226,686	81.1	9,173	9,173	9,173	9,173
Canadian Pacific Lines in Vermont.....Feb. 85		58,061	22,561	80,622	11,162	27,470	75,380	118.2	2,517	2,517	2,517	2,517
Central of Georgia.....Feb. 1,944		1,074,027	206,653	1,280,680	22,610	60,070	157,028	114.1	5,735	5,735	5,735	5,735
Central of Georgia.....Feb. 1,944		2,184,289	401,794	2,586,083	1,434,067	237,833	613,419	79.5	81,214	81,214	81,214	81,214
Central New Jersey.....Feb. 692		2,486,078	512,544	3,000,622	3,182,036	744,154	1,269,850	77.7	162,590	162,590	162,590	162,590
Central Vermont.....Feb. 462		5,288,533	86,347	5,374,880	584,283	1,521,904	2,872,387	80.9	114,905	114,905	114,905	114,905
Chesapeake & Ohio.....Feb. 3,119		7,963,942	315,660	8,279,602	273,399	444,154	3,666,164	88.8	257,386	257,386	257,386	257,386
Chicago & Alton.....Feb. 1,028		17,601,469	709,892	18,311,361	2,909,931	3,823,972	5,216,625	70.5	318,173	318,173	318,173	318,173
Chicago & Alton.....Feb. 1,028		1,108,664	281,078	1,389,742	1,547,086	354,686	59,825	82.3	59,825	59,825	59,825	59,825
Chicago & Alton.....Feb. 1,028		2,225,598	615,863	2,841,461	3,161,089	297,211	1,356,420	88.4	1,361,126	1,361,126	1,361,126	1,361,126
Chicago & Eastern Illinois.....Feb. 938		972,334	151,621	1,123,955	133,606	313,606	584,687	99.8	74,059	74,059	74,059	74,059
Chicago & Eastern Illinois.....Feb. 938		2,055,641	341,919	2,397,560	150,114	1,228,479	2,558,412	97.7	147,702	147,702	147,702	147,702
Chicago & Illinois Midland.....Feb. 131		202,748	2,491	205,239	24,889	53,693	72,310	91.8	20,196	20,196	20,196	20,196
Chicago & Illinois Midland.....Feb. 131		449,067	5,518	454,585	51,690	121,593	155,364	88.1	40,738	40,738	40,738	40,738

Revenues and Expenses of Railways

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1931—CONTINUED

Name of road	Av. mileage operated during period.	Operating revenues			Operating expenses				Operating income (or loss).	Net operating income, 1930.		
		Freight.	Passenger (inc. misc.)	Total	Maintenance of way and structures.	Equip. ment.	Traffic.	Trans- portation.			General.	Total.	Operating ratio.
Chicago & North Western	Feb. 8,458	\$5,937,384	\$1,090,795	\$7,891,135	\$898,259	\$1,620,605	\$178,242	\$3,408,436	\$378,518	\$6,537,159	82.8	\$868,349
..... 2 mos.	8,458	2,059,303	224,004	16,319,008	1,753,129	3,380,007	308,186	3,204,012	766,090	13,580,749	83.2	1,488,057
Chicago, Burlington & Quincy	Feb. 9,310	7,248,399	845,696	9,038,177	842,064	1,414,816	473,410	3,136,227	345,336	6,044,277	66.9	2,879,518
..... 2 mos.	9,322	15,417,766	1,858,649	19,216,802	1,689,259	3,187,340	478,240	6,702,234	726,070	12,919,027	67.2	4,485,862
Chicago Great Western	Feb. 1,495	1,295,115	107,317	1,508,777	116,032	185,757	79,901	590,931	52,769	1,027,864	68.1	166,414
..... 2 mos.	1,495	2,670,524	233,533	3,121,997	267,921	359,007	155,334	1,253,305	114,544	2,159,890	69.2	290,853
Chicago, Indianapolis & Louisville	Feb. 6,447	7,277,609	84,354	900,820	93,299	200,632	33,757	379,091	33,966	750,465	83.3	96,272
..... 2 mos.	6,447	1,532,481	196,879	1,917,688	182,154	419,527	68,306	797,864	69,521	1,555,571	81.1	162,941
Chic., Mil., St. Paul & Pacific	Feb. 11,322	7,005,749	680,620	8,556,910	914,426	1,959,238	272,020	3,544,341	352,083	7,047,328	82.4	1,161,286
..... 2 mos.	11,322	14,592,188	1,496,161	17,918,802	1,811,691	3,922,249	577,227	7,581,342	702,517	14,042,154	82.5	2,347,699
Chicago River & Indiana	Feb. 20	.....	.....	437,563	45,000	40,000	1,750	144,296	20,240	51,286	57.4	234,528
..... 2 mos.	20	.....	.....	911,665	90,000	80,000	3,694	309,221	35,645	518,360	56.9	501,295
Chicago, Rock Island & Pacific	Feb. 7,593	5,806,691	883,945	7,392,788	732,892	1,415,054	230,492	2,964,187	336,823	5,774,570	78.1	723,487
..... 2 mos.	7,593	12,016,700	1,864,470	14,991,828	1,499,316	2,862,196	471,149	6,231,709	680,065	11,942,691	77.6	1,187,230
Chicago, Rock Island & Gulf	Feb. 6,255	3,660,559	46,756	438,554	61,274	36,197	20,271	149,522	22,407	292,407	66.7	88,472
..... 2 mos.	6,255	778,847	98,910	943,061	121,920	77,102	39,877	311,253	43,362	598,368	63.4	150,708
Chic., St. Paul, Minn. & Omaha	Feb. 1,736	1,095,873	168,469	1,390,993	196,916	309,230	39,861	703,732	83,446	1,342,167	96.5	184,541
..... 2 mos.	1,736	2,369,657	373,695	3,054,939	415,231	608,476	78,232	1,492,344	167,017	2,781,500	92.6	391,469
Clinchfield R. R.	Feb. 309	435,746	6,600	51,146	64,863	123,926	20,211	104,162	17,366	330,271	73.2	184,215
..... 2 mos.	309	927,994	15,388	960,789	130,051	246,910	40,498	214,827	36,142	668,294	69.6	431,852
Colorado & Southern	Feb. 1,037	521,149	43,124	628,436	61,242	149,394	14,951	239,820	38,944	506,313	80.8	117,499
..... 2 mos.	1,037	1,175,813	102,599	1,408,203	137,902	309,257	29,828	528,217	80,739	1,089,895	77.4	319,237
Ft. Worth & Denver City	Feb. 696	419,798	64,412	523,203	55,974	92,163	18,585	182,770	37,293	387,956	74.2	100,438
..... 2 mos.	696	890,841	144,253	1,119,968	113,151	198,781	37,676	403,917	75,234	836,204	74.7	262,993
Wichita Valley	Feb. 270	99,137	1,301	42,673	9,598	4,009	26	22,033	1,807	37,300	87.4	—10,713
..... 2 mos.	270	30,801	3,321	98,785	18,523	7,688	36	46,281	3,711	76,011	76.9	—8,456
Columbus & Greenville	Feb. 167	74,382	4,863	84,176	13,752	12,955	3,522	34,790	10,362	73,769	88.8	14,703
..... 2 mos.	167	147,344	13,185	171,309	27,020	27,156	7,425	72,772	22,299	156,660	91.4	48,204
Conemaugh & Black Lick	Feb. 20	29,662	.....	69,576	10,742	17,623	533	50,328	3,417	82,693	118.9	12,122
..... 2 mos.	20	56,908	.....	133,411	18,526	33,093	1,142	95,909	6,967	155,637	116.7	19,740
Delaware & Hudson	Feb. 882	2,250,167	169,552	2,565,138	425,570	648,264	54,256	1,022,154	150,508	2,066,207	89.9	494,841
..... 2 mos.	882	4,638,546	370,506	5,319,149	937,554	1,345,628	109,688	2,088,570	306,858	4,800,141	90.2	896,120
Delaware, Lackawanna & Western	Feb. 998	3,527,024	712,895	4,833,679	421,787	939,522	132,851	2,144,222	172,638	3,849,935	79.6	805,029
..... 2 mos.	998	7,134,183	1,485,978	9,854,912	917,340	1,865,196	265,866	4,462,601	352,006	7,940,583	80.6	1,435,292
Denver & Rio Grande Western	Feb. 2,569	1,492,169	115,416	1,714,481	207,232	428,532	55,480	562,342	85,901	1,353,529	79.1	302,263
..... 2 mos.	2,569	3,360,925	249,500	3,847,366	478,088	881,858	110,898	1,236,549	175,527	2,914,582	75.8	839,627
Denver & Salt Lake	Feb. 232	90,125	8,015	111,171	24,322	36,913	1,742	26,973	10,712	100,662	90.5	546,818
..... 2 mos.	232	292,671	17,472	337,062	55,289	78,732	3,807	55,162	21,861	221,863	89.5	1,056,453
Detroit & Mackinac	Feb. 232	67,620	4,258	66,040	9,791	9,856	1,390	24,311	4,274	49,690	82.8	1,345,292
..... 2 mos.	232	91,967	10,411	118,740	21,570	21,763	2,693	51,347	8,456	105,826	89.1	302,263
Detroit & Toledo Shore Line	Feb. 50	279,241	.....	283,195	19,050	26,618	7,144	74,472	7,964	135,247	47.8	546,818
..... 2 mos.	50	577,971	.....	585,535	40,769	55,540	14,918	155,481	16,042	282,746	48.3	1,056,453
Detroit Terminal	Feb. 19	.....	.....	86,365	9,181	9,270	.....	46,705	4,001	69,157	80.1	1,345,292
..... 2 mos.	19	.....	.....	175,587	18,364	18,541	.....	92,777	8,177	137,865	78.5	302,263
Detroit, Toledo & Ironton	Feb. 500	665,451	942	678,587	63,240	80,467	13,098	197,435	30,883	384,239	56.6	805,029
..... 2 mos.	504	1,236,902	2,326	1,265,766	151,934	166,557	25,688	395,393	64,834	803,008	63.4	1,435,292
Duluth, Missabe & Northern	Feb. 564	94,896	3,289	116,843	127,888	289,180	4,083	177,537	37,166	635,848	54.2	1,056,453
..... 2 mos.	564	195,344	6,995	241,893	258,367	578,376	8,985	372,089	73,379	1,291,829	53.4	1,056,453
Duluth, Winnipeg & Pacific	Feb. 178	104,717	6,130	116,069	19,458	34,304	4,576	59,156	7,715	126,495	109.0	1,056,453
..... 2 mos.	178	231,970	12,090	252,924	41,038	72,606	9,943	125,144	15,361	206,116	104.8	1,056,453
Elgin, Joliet & Eastern	Feb. 447	1,230,720	Dr. 2	1,346,768	162,221	311,892	5,851	554,408	51,858	1,096,192	81.4	1,056,453
..... 2 mos.	447	2,554,757	.....	2,793,575	335,865	614,828	25,720	1,152,624	107,053	2,264,923	81.1	1,056,453
Erie Railroad	Feb. 2,046	612,188	655,312	648,453	655,312	1,473,365	152,740	2,487,078	280,577	5,079,242	79.7	1,056,453
..... 2 mos.	2,046	10,879,931	13,221,195	13,221,195	13,221,195	3,026,366	314,947	5,253,644	573,880	10,531,942	78.3	1,056,453
Chicago & Erie	Feb. 269	785,755	30,276	863,415	94,383	111,058	27,826	267,898	44,626	545,513	63.2	1,056,453
..... 2 mos.	269	1,651,428	70,018	1,820,428	189,259	231,913	56,004	566,960	86,977	1,119,058	62.0	1,056,453

Revenues and Expenses of Railways

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1931—CONTINUED

Name of road	Av. mileage operated during period.	Operating revenues			Operating expenses			Net from railway operation.	Operating income (or loss).	Net operating income.	Net operating income, 1930.
		Freight.	Passenger.	Total.	Way and structures.	Maintenance of equip. ment.	Trans- portation.				
			(inc. misc.)								
New Jersey & New York.....	45	\$20,436	\$81,699	\$102,135	\$8,427	\$20,955	\$2,902	\$87,099	\$13,851	\$19,679	\$19,679
2 mos.....	45	40,204	166,156	206,360	17,477	44,714	5,885	185,853	27,167	41,740	41,740
N. Y., Susquehanna & Western.....	131	307,978	33,228	341,206	30,547	45,832	138,089	231,337	106,429	75,676	26,785
2 mos.....	131	657,087	67,775	724,862	57,405	100,179	312,820	504,855	218,522	150,516	65,711
Florida East Coast.....	864	575,565	538,218	1,113,783	128,275	168,633	300,334	711,853	453,550	389,900	569,237
2 mos.....	864	1,160,022	919,119	2,079,141	268,412	342,237	628,709	1,467,488	711,940	580,964	895,178
Fort Smith & Western.....	249	160,140	3,086	163,226	11,897	13,495	29,090	64,502	143	8,665	8,665
2 mos.....	249	336,036	7,307	343,343	27,226	28,601	65,389	140,841	11,319	5,323	20,561
Galveston Wharf.....	13	.....	.....	.....	31,958	3,557	25,086	84,713	21,569	21,543	286
2 mos.....	13	.....	.....	.....	59,226	8,485	52,210	168,137	48,407	48,407	26,508
Georgia R. R.....	328	271,314	23,018	294,332	35,474	64,336	321,950	303,444	10,598	19,682	19,682
2 mos.....	328	530,126	54,618	584,744	68,558	131,011	43,765	611,358	12,753	39,502	85,278
Georgia & Florida.....	463	95,681	3,653	99,334	27,688	22,019	49,027	117,544	19,154	21,643	2,271
2 mos.....	463	185,736	7,620	193,356	55,215	44,265	101,056	238,327	46,834	50,246	26,595
Grand Trunk Western.....	1,019	1,500,616	107,651	1,608,267	174,204	352,039	778,218	1,493,556	124,876	96,158	227,078
2 mos.....	1,019	2,965,959	232,545	3,198,504	370,589	711,705	1,567,861	3,041,434	180,532	278,331	394,908
Canadian Nat. Lines in N. England, Feb.....	172	120,072	15,218	135,290	24,596	36,794	81,672	164,401	30,871	85,764	66,188
2 mos.....	172	240,072	30,218	270,290	48,736	74,040	166,294	326,634	59,445	162,170	147,741
Great Northern.....	8,370	4,440,484	481,835	4,922,319	472,756	1,310,881	2,161,034	4,224,687	310,075	137,027	28,903
2 mos.....	8,370	9,058,566	1,026,357	10,084,923	1,027,854	2,701,684	4,448,680	9,270,467	578,966	262,476	31,970
Green Bay & Western.....	234	105,445	1,626	107,071	18,597	20,933	48,163	96,173	89,6	4,670	17,034
2 mos.....	234	207,874	3,252	211,126	42,431	46,683	100,627	207,285	25,338	3,553	43,822
Gulf & Ship Island.....	307	.....	.....	.....	42,769	25,459	75,609	156,447	120,0	69,599	3,301
2 mos.....	307	.....	.....	.....	82,058	50,696	155,239	313,230	33,103	113,460	1,298
Gulf, Mobile & Northern.....	733	287,198	11,434	298,632	61,744	62,446	124,202	298,653	94,27	8,559	13,745
2 mos.....	733	566,324	25,389	591,713	116,624	132,965	269,723	621,721	185,491	49,778	1,279
Illinois Central.....	5,018	6,265,580	1,157,350	7,422,930	833,081	2,055,249	3,324,731	6,985,569	401,036	383,852	1,460,083
2 mos.....	5,018	13,145,422	2,455,995	15,601,417	1,924,535	4,113,498	7,041,531	14,674,757	2,405,986	885,720	2,756,083
Yazoo & Mississippi Valley.....	1,681	1,099,901	126,881	1,226,782	245,285	265,854	624,998	1,244,963	95,1	215,305	326,122
2 mos.....	1,681	2,233,368	272,750	2,506,118	483,053	542,033	1,311,581	2,555,633	130,664	32,378	328,160
Illinois Central System.....	6,706	7,365,481	1,284,231	8,649,712	1,198,366	2,321,103	3,949,737	8,230,532	1,112,211	108,542	1,788,486
2 mos.....	6,706	15,438,790	2,728,745	18,167,535	2,407,588	4,655,333	8,333,112	17,023,128	957,723	513,342	3,286,188
Illinois Terminal.....	534	390,700	82,516	473,216	54,536	74,811	169,137	357,526	109,912	84,381	97,725
2 mos.....	534	782,522	174,031	956,553	105,547	144,438	354,395	720,881	223,595	172,123	195,034
Kansas City Southern.....	784	915,015	42,910	957,925	68,186	171,056	313,853	653,714	322,577	292,078	246,868
2 mos.....	784	1,884,684	90,834	1,975,518	152,229	367,415	670,076	1,426,038	593,760	540,539	480,405
Texas & Ft. Smith.....	99	102,591	3,020	105,611	17,106	11,218	42,267	91,216	25,952	4,216	35,641
2 mos.....	99	228,304	5,994	234,298	31,574	24,821	86,462	182,578	79,071	13,893	61,843
Kansas, Oklahoma & Gulf.....	326	194,531	1,251	195,782	14,133	23,703	13,422	176,617	87,888	51,773	87,748
2 mos.....	326	396,421	2,444	398,865	32,625	45,582	27,327	330,357	177,863	140,720	191,572
Lake Superior & Ishpeming.....	160	47,146	678	47,824	21,417	27,739	28,993	85,136	51,073	33,449	38,741
2 mos.....	160	97,489	1,382	98,871	41,744	59,691	59,756	176,208	103,912	110,247	89,005
Lake Terminal.....	12	.....	.....	.....	4,495	11,966	.....	51,933	5,044	9,724	11,557
2 mos.....	12	.....	.....	.....	19,710	22,906	62,352	107,736	19,646	23,658	31,460
Lehigh & Hudson River.....	96	152,200	632	152,832	13,529	26,232	58,579	111,369	49,484	35,541	19,887
2 mos.....	96	312,340	1,271	313,611	32,162	54,486	126,346	239,097	92,206	64,977	33,822
Lehigh & New England.....	216	346,894	763	347,657	61,655	64,122	128,143	276,617	62,339	73,457	63,027
2 mos.....	216	717,296	1,699	718,995	96,166	142,397	262,511	559,478	165,629	162,527	122,877
Lehigh Valley.....	1,361	3,549,281	335,791	3,885,072	261,854	1,016,501	1,896,415	3,458,293	453,999	358,196	642,444
2 mos.....	1,361	7,413,736	733,360	8,147,096	573,670	2,062,209	3,892,898	7,108,836	1,120,801	922,999	1,242,210
Louisiana & Arkansas.....	608	172,078	11,825	183,903	61,252	53,575	21,150	129,136	178,705	67,836	90,884
2 mos.....	608	353,785	24,519	378,304	132,390	103,874	258,675	585,794	238,890	119,029	140,638
Louisiana, Arkansas & Texas.....	202	56,342	1,261	57,603	14,191	8,695	27,611	59,206	3,090	11,337	11,337
2 mos.....	202	124,230	2,424	126,654	28,561	15,591	56,551	117,990	13,660	10,781	5,741
Louisville & Nashville.....	5,270	5,807,394	711,010	6,518,404	1,100,554	1,730,339	2,779,528	6,274,274	299,616	315,306	1,178,612
2 mos.....	5,270	12,699,890	1,563,733	14,263,623	2,288,256	3,676,719	5,905,699	13,292,137	1,133,197	1,162,609	2,330,458

Revenues and Expenses of Railways

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1931—(CONTINUED)

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from operation	Operating income (or loss)	Net operating income, 1930
		Freight	Passenger (inc. misc.)	Total	Way and structures	Maintenance of equip ment	Traffic	Transportation			
Maine Central	Feb. 1,121	\$999,956	\$160,469	\$1,160,425	\$181,090	\$218,255	\$16,276	\$24,220	\$1,175,840	\$186,210	\$254,521
	2 mos. 1,121	2,091,734	350,870	2,442,604	374,300	466,960	31,852	1,101,257	2,065,450	404,230	279,140
Midland Valley	Feb. 363	142,185	2,766	144,951	18,790	19,428	5,449	13,826	130,641	34,004	54,505
	2 mos. 363	321,328	5,796	327,124	41,068	39,203	11,257	102,676	219,043	95,086	122,737
Minneapolis & St. Louis	Feb. 1,627	665,022	29,690	694,712	74,886	186,364	36,124	409,108	43,531	52,419	36,274
	2 mos. 1,627	1,402,786	67,164	1,470,950	156,498	374,060	75,045	838,538	99,099	154,420	119,840
Minn., St. Paul & S. S. Marie	Feb. 4,379	1,857,717	153,470	2,011,187	276,627	545,718	68,776	980,562	116,964	2,928	69,206
	2 mos. 4,379	3,808,779	344,391	4,153,170	573,599	1,103,340	145,338	2,072,421	244,114	43,408	274,469
Duluth, South Shore & Atlantic	Feb. 560	195,138	19,524	214,662	33,217	41,909	7,834	109,697	9,640	26,782	19,522
	2 mos. 560	392,776	51,251	444,027	59,933	84,845	15,592	227,119	19,661	67,065	12,497
Spokane International	Feb. 163	99,840	2,865	102,705	11,214	6,543	3,111	24,008	5,567	3,047	3,911
	2 mos. 163	199,680	5,730	205,410	22,415	13,219	6,583	50,991	11,290	1,295	4,816
Mississippi Central	Feb. 150	73,107	2,115	75,222	14,697	14,103	9,536	26,606	6,970	137	12,461
	2 mos. 150	156,775	4,596	161,371	27,877	29,801	18,713	54,303	13,966	10,610	27,576
Missouri & North Arkansas	Feb. 364	90,493	2,155	92,648	24,634	14,531	9,953	41,470	7,707	2,132	14,588
	2 mos. 364	179,709	4,728	184,437	55,433	31,159	19,681	89,942	15,946	19,446	8,714
Missouri-Illinois	Feb. 202	94,138	892	95,030	13,824	24,715	3,383	33,796	7,049	7,789	22,308
	2 mos. 202	202,006	2,019	204,025	26,003	51,793	7,396	72,159	13,935	22,440	38,395
Missouri-Kansas-Texas Lines	Feb. 3,188	1,971,316	281,098	2,252,414	298,613	512,793	115,731	965,666	136,264	248,004	378,568
	2 mos. 3,188	4,232,525	639,164	4,871,689	613,979	998,774	245,589	2,003,797	333,845	793,343	796,902
Missouri Pacific	Feb. 7,450	6,358,281	636,147	6,994,428	730,232	1,323,339	259,201	2,823,098	339,151	1,730,147	1,853,773
	2 mos. 7,450	13,181,581	1,346,552	14,528,133	1,552,482	2,697,817	573,964	6,031,242	702,740	3,450,133	3,300,554
Gulf Coast Lines	Feb. 1,037	866,188	93,780	965,968	152,681	321,971	46,406	321,971	61,182	246,040	328,821
	2 mos. 1,037	1,819,574	184,817	2,004,391	390,434	793,434	92,658	655,041	117,457	474,818	726,892
International Great Northern	Feb. 1,159	1,043,128	106,410	1,149,538	193,127	182,720	40,527	496,272	62,459	227,527	118,857
	2 mos. 1,159	2,086,256	212,820	2,299,076	387,744	357,744	81,218	971,218	129,879	455,878	257,926
San Antonio, Uvalde & Gulf	Feb. 316	145,238	10,863	156,101	39,072	35,289	5,690	31,754	10,403	25,351	27,066
	2 mos. 316	290,476	21,726	312,202	78,144	70,578	11,343	63,525	20,803	46,722	53,808
Mobile & Ohio	Feb. 1,152	764,433	34,110	798,543	119,320	162,057	50,462	355,638	48,478	34,304	17,831
	2 mos. 1,152	1,528,866	68,220	1,597,086	246,401	350,134	104,421	754,344	99,606	95,563	76,320
Monongahela	Feb. 177	393,214	3,142	396,356	60,000	45,000	1,224	101,663	10,993	164,846	100,651
	2 mos. 177	811,481	6,870	818,351	120,000	90,000	2,681	214,662	21,885	343,627	226,006
Monongahela Connecting	Feb. 6	.....	93,818	93,818	10,911	24,485	300	53,656	2,912	4,545	15,972
	2 mos. 6	.....	187,636	187,636	23,012	50,578	600	108,325	6,073	13,949	35,004
Montour	Feb. 57	161,666	.....	161,666	11,988	41,084	1,387	51,414	7,398	48,336	61,980
	2 mos. 57	323,332	.....	323,332	24,029	87,564	2,891	107,905	15,013	116,509	142,752
Nashville, Chattanooga & St. Louis	Feb. 1,203	1,019,703	135,231	1,154,934	206,373	270,375	80,681	520,312	76,472	62,877	189,881
	2 mos. 1,203	2,046,454	295,984	2,342,438	420,325	563,192	154,820	1,059,593	157,839	129,291	89,498
Nevada Northern	Feb. 165	56,556	1,987	58,543	12,537	4,300	949	13,074	4,650	1,190	18,480
	2 mos. 165	113,112	3,974	117,086	25,074	8,600	1,898	26,993	9,203	1,665	46,875
Newburgh & South Shore	Feb. 6	.....	94,637	94,637	21,599	23,959	.....	43,345	6,921	14,202	2,931
	2 mos. 6	.....	179,274	179,274	43,198	50,349	.....	91,267	14,083	49,325	30,116
New Orleans Great Northern	Feb. 264	151,227	8,723	160,000	22,493	21,531	13,757	53,428	10,363	33,596	30,816
	2 mos. 264	322,030	18,171	340,201	44,986	54,788	28,980	113,167	21,793	70,704	45,077
New Orleans Terminal	Feb. 20	2,202	.....	2,202	100,559	18,955	.....	51,729	1,484	5,744	9,832
	2 mos. 20	4,404	.....	4,404	201,118	37,910	.....	103,458	2,968	11,488	19,664
New York Central	Feb. 11,421	20,215,578	7,057,930	27,273,508	3,638,835	7,025,565	680,736	12,143,413	1,345,624	2,822,488	5,155,911
	2 mos. 11,421	41,396,514	15,713,160	57,109,674	7,644,501	14,844,485	1,417,873	25,413,924	2,698,917	5,940,868	9,721,647
Indiana Harbor Belt	Feb. 118	.....	748,003	748,003	70,000	95,000	4,558	358,737	25,740	130,881	181,506
	2 mos. 118	.....	1,496,006	1,496,006	140,000	190,000	9,233	725,851	57,559	266,174	341,298
Pittsburgh & Lake Erie	Feb. 235	1,326,609	109,309	1,435,918	120,310	148,268	4,800	277,141	194,665	92,065	512,123
	2 mos. 235	2,653,218	218,618	2,871,836	240,620	296,536	9,600	554,282	389,330	184,130	363,321
New York, Chicago & St. Louis	Feb. 1,698	2,721,467	101,253	2,822,720	345,327	602,122	116,920	1,212,411	128,938	274,360	481,303
	2 mos. 1,698	5,442,934	202,506	5,645,440	690,654	1,204,244	233,840	2,426,691	260,876	545,726	962,642
N. Y., New Haven & Hartford	Feb. 2,121	4,266,763	2,910,856	7,177,619	899,357	1,352,296	89,828	2,781,167	276,650	1,986,928	1,904,612
	2 mos. 2,121	8,606,974	6,052,273	14,659,247	1,755,170	2,757,189	175,804	5,837,968	592,070	3,970,995	3,786,980

Revenues and Expenses of Railways

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1931—CONTINUE

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income	Net operating income, 1930
		Freight	Passenger (inc. misc.)	Total	Maintenance of way and structures	Traffic	Trans- portation					
New York Connecting.....	Feb. 20	\$167,092	\$180,428	\$347,520	\$12,405	Cr. \$1,144	\$36,195	26.8	132,065	95,115	63,776	103,332
New York, Ontario & Western.....	Feb. 20	346,528	375,181	721,709	27,986	6,918	107,687	28.7	267,484	193,594	133,827	196,771
New York, Ontario & Western.....	Feb. 568	649,335	36,285	685,620	72,400	150,649	362,937	78.3	175,078	132,560	84,736	191,668
New York, Ontario & Western.....	Feb. 568	1,305,246	68,193	1,373,439	142,248	299,894	742,354	78.8	345,526	260,330	164,303	41,035
Norfolk & Western.....	Feb. 2,235	577,594	205,773	783,367	776,762	1,323,338	1,699,729	67.5	2,012,710	1,262,389	1,387,625	2,895,098
Norfolk & Western.....	Feb. 2,235	11,965,284	479,725	12,445,009	1,565,028	2,699,357	3,267,803	66.8	4,278,680	2,777,652	3,066,308	5,748,154
Norfolk Southern.....	Feb. 932	800,848	27,664	828,512	71,364	81,452	196,920	90.7	399,857	7,894	22,140	15,673
Norfolk Southern.....	Feb. 932	800,848	27,664	828,512	138,627	159,196	406,999	91.0	805,535	17,347	40,936	36,326
Northern Pacific.....	Feb. 6,789	3,642,972	381,114	4,024,086	525,865	1,271,533	1,897,108	94.3	2,533,483	396,528	145,494	389,389
Northern Pacific.....	Feb. 6,789	7,493,519	868,454	8,361,973	1,015,320	2,518,355	4,024,311	92.7	676,259	628,615	61,603	368,671
Northwestern Pacific.....	Feb. 441	150,544	94,631	245,175	89,789	71,034	165,137	128.3	77,495	113,733	122,531	72,588
Northwestern Pacific.....	Feb. 441	301,993	190,927	492,920	181,901	145,149	341,054	128.5	159,105	231,555	246,459	180,565
Oklahoma City-Ada-Atoka.....	Feb. 132	38,103	1,590	39,693	12,079	2,774	15,358	81.7	7,819	2,892	6,834	6,275
Oklahoma City-Ada-Atoka.....	Feb. 132	91,075	3,449	94,524	26,206	5,828	33,138	73.9	26,218	16,404	4,511	11,579
Pennsylvania Railroad.....	Feb. 10,891	25,066,741	7,177,597	32,244,338	4,809,278	7,870,799	14,824,822	84.4	5,052,817	3,444,538	2,383,937	6,259,652
Pennsylvania Railroad.....	Feb. 10,891	52,077,041	15,685,115	67,762,156	9,863,269	16,341,951	30,729,802	84.0	11,981,333	7,632,174	5,411,333	12,623,235
Long Island.....	Feb. 404	714,535	1,723,930	2,438,465	288,541	448,119	1,143,154	76.4	605,331	486,953	332,002	327,896
Long Island.....	Feb. 404	1,484,723	3,555,572	5,040,295	614,590	908,351	2,664,798	76.0	1,279,998	1,037,080	714,143	642,846
Peoria & Pekin Union.....	Feb. 17	16,405	481	16,886	4,986	9,676	48,233	70.9	31,049	14,049	45,483	30,358
Peoria & Pekin Union.....	Feb. 17	16,405	481	16,886	13,921	19,938	108,993	71.2	65,154	30,654	83,276	60,471
Pere Marquette.....	Feb. 2,265	1,951,421	111,600	2,063,021	341,254	481,218	925,396	88.2	257,767	93,235	113,704	698,566
Pittsburgh & Shawmut.....	Feb. 2,265	3,896,794	262,797	4,159,591	746,306	960,273	1,907,680	90.1	434,654	102,137	12,565	521,510
Pittsburgh & Shawmut.....	Feb. 102	68,235	1,713	69,948	12,171	23,395	20,278	86.3	9,681	8,612	7,757	17,629
Pittsburgh & Shawmut.....	Feb. 102	141,863	3,517	145,380	24,457	45,332	44,242	85.0	22,130	19,962	18,772	54,103
Pittsburgh & West Virginia.....	Feb. 92	210,759	2,066	212,825	29,816	66,310	97,781	80.1	47,807	32,901	59,202	106,611
Pittsburgh & West Virginia.....	Feb. 92	433,367	4,513	437,880	63,394	131,926	103,613	80.1	97,911	65,246	121,481	240,840
Pittsburgh, Shawmut & Northern.....	Feb. 198	103,980	409	104,389	14,370	19,679	37,961	74.8	26,898	24,120	20,942	27,755
Pittsburgh, Shawmut & Northern.....	Feb. 198	205,291	867	206,158	27,915	40,662	76,416	76.4	605,331	486,953	332,002	327,896
Quincy, Omaha & Kansas City.....	Feb. 249	26,449	2,851	29,300	12,600	4,639	20,053	120.2	6,815	11,568	14,060	7,056
Quincy, Omaha & Kansas City.....	Feb. 249	53,081	5,971	59,052	24,439	11,231	41,845	127.0	18,504	28,012	33,133	17,322
Reading.....	Feb. 1,454	5,200,095	402,801	5,602,896	881,035	1,568,991	2,514,966	86.6	679,591	444,102	406,997	1,046,061
Reading.....	Feb. 1,454	10,963,982	859,050	11,823,032	1,724,593	3,373,927	5,256,783	87.4	1,592,322	1,143,385	1,091,776	1,917,326
Atlantic City.....	Feb. 163	89,523	42,714	132,237	49,218	15,728	139,647	148.3	68,874	110,474	114,271	107,022
Atlantic City.....	Feb. 163	189,055	90,863	279,918	101,102	38,853	292,463	149.2	147,480	230,680	251,979	233,887
Richmond, Fredericksburg & Potomac.....	Feb. 117	405,865	285,772	691,637	54,679	143,936	295,628	65.9	286,976	234,476	166,374	186,299
Richmond, Fredericksburg & Potomac.....	Feb. 117	816,492	580,280	1,396,772	117,724	290,694	606,913	67.9	539,864	438,364	306,819	351,142
Rutland.....	Feb. 413	201,936	65,820	267,756	70,669	72,966	160,434	95.7	15,067	5,926	639	28,533
Rutland.....	Feb. 413	401,127	137,655	538,782	148,159	152,120	334,654	98.0	14,097	27,720	18,205	44,357
St. Louis-San Francisco.....	Feb. 5,265	3,649,976	465,600	4,115,576	441,938	837,026	1,604,488	72.0	1,256,524	878,767	833,648	1,479,785
St. Louis-San Francisco.....	Feb. 5,265	7,344,600	998,006	8,342,606	963,473	1,741,346	3,399,243	74.6	2,324,288	1,608,076	1,499,167	2,652,048
Ft. Worth & Rio Grande.....	Feb. 233	29,752	3,419	33,171	21,916	11,537	31,201	182.9	32,373	36,813	44,344	34,255
Ft. Worth & Rio Grande.....	Feb. 233	70,990	6,382	77,372	1,239,273	2,434,569	6,663,49	155.3	49,871	59,620	75,303	44,326
St. Louis, San Francisco & Texas.....	Feb. 262	81,484	6,111	87,595	20,257	18,125	47,319	109.0	8,266	12,421	43,407	10,628
St. Louis, San Francisco & Texas.....	Feb. 262	190,750	13,129	203,879	46,466	36,303	100,995	99.3	1,475	6,901	67,397	27,488
St. Louis Southwestern Lines.....	Feb. 1,913	1,241,544	41,333	1,282,877	200,345	244,799	511,650	84.5	212,867	122,024	63,326	151,772
St. Louis Southwestern Lines.....	Feb. 1,913	2,494,661	86,986	2,581,647	421,478	500,776	1,088,304	86.6	369,855	188,122	63,387	151,768
San Diego & Arizona.....	Feb. 155	46,535	20,669	67,204	12,715	14,420	7,453	88.3	7,983	2,400	4,158	7,493
San Diego & Arizona.....	Feb. 155	101,858	41,929	143,787	25,934	29,550	46,170	85.7	21,020	9,854	13,643	50,586
Seaboard Air Line.....	Feb. 4,481	3,152,561	552,374	3,704,935	640,201	707,987	1,431,685	78.1	896,807	535,818	412,271	827,346
Seaboard Air Line.....	Feb. 4,481	6,145,847	810,913	6,956,760	1,239,273	2,434,569	3,399,243	79.9	1,631,899	948,861	651,372	1,634,863
Southern Ry.....	Feb. 6,730	6,183,894	1,020,079	7,203,973	1,298,584	1,715,936	3,089,185	85.4	1,445,902	499,605	342,492	1,015,510
Southern Ry.....	Feb. 6,730	12,721,155	2,275,411	14,996,566	2,635,956	3,557,572	6,441,901	85.2	2,407,982	1,111,950	762,730	2,341,443
Alabama Great Southern.....	Feb. 315	380,703	62,578	443,281	106,595	124,071	196,071	97.6	11,601	29,819	21,773	74,954
Alabama Great Southern.....	Feb. 315	797,079	137,971	935,050	214,724	260,113	394,684	94.7	53,906	31,889	11,378	137,082
Cinn., New Orleans & Tex. Pac.....	Feb. 338	974,116	1,201,365	2,175,481	338,585	397,470	1,051,713	87.5	149,652	80,061	81,580	292,779
Cinn., New Orleans & Tex. Pac.....	Feb. 338	2,092,175	325,966	2,418,141	630,983	650,661	1,061,145	85.1	383,024	229,681	239,680	594,746

Continued on Next Left Hand Page

THE ENGINEER



HE is educated and trained to do the best he can with the equipment under his control.

HE is responsible for the operation of the locomotive.

HE is in control of Power, the factor governing train operation.

In the next locomotives you buy, give him the benefit of Super-Power, not just heavier engines. Super-Power should include

**A GENEROUS BOILER
INCREASED CYLINDER POWER
ECONOMY OF OPERATION
EASY RIDING QUALITIES
CONVENIENCE AND COMFORT IN THE CAB**

Give him SUPER-POWER and he will DECREASE your operating Costs.



LIMA LOCOMOTIVE WORKS

INCORPORATED

LIMA - - - - - OHIO

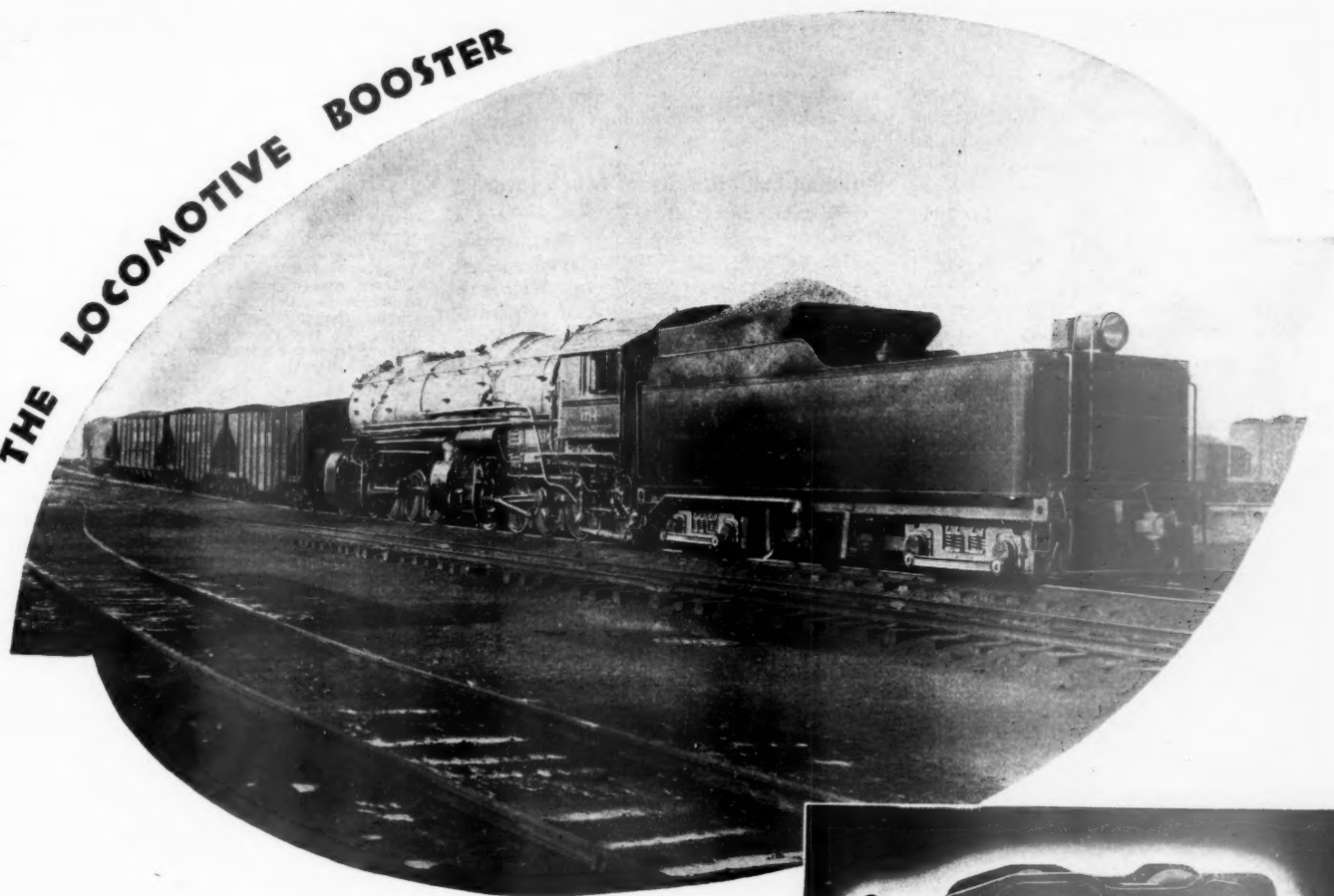
Revenues and Expenses of Railways

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1931—CONTINUED

Name of road	Mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net operating income, 1930
		Freight	Passenger (inc. misc.)	Total	Maintenance of way and structures	Equip. ment.	Traffic	Trans- portation			
Georgia Southern & Florida.....	Feb. 397	\$169,937	\$73,080	\$243,017	\$52,941	\$56,936	\$1,553	\$97,159	\$218,377	\$30,551	\$71,759
.....2 mos.	794	349,874	151,368	501,242	109,009	119,589	3,331	208,952	453,391	56,878	117,054
New Orleans-Northeastern	Feb. 204	200,889	34,523	235,412	45,895	61,463	10,447	96,303	229,531	16,418	15,245
.....2 mos.	408	415,301	71,415	522,740	100,720	127,635	21,625	213,394	494,880	33,336	17,780
Northern Alabama	Feb. 110	48,023	2,173	50,196	18,161	2,479	1,719	22,583	47,715	—850	8,656
.....2 mos.	220	107,348	4,731	112,079	38,822	5,400	3,564	48,793	102,172	19,488	13,911
Southern Pacific	Feb. 9,128	7,947,445	2,424,950	10,372,395	1,560,595	2,267,947	351,651	4,240,003	9,263,358	610,354	2,292,492
.....2 mos.	18,256	16,590,349	5,075,105	23,766,231	3,353,770	4,924,696	687,413	8,910,827	19,635,457	1,760,188	3,811,095
So. Pacific Steamship Lines.....	Feb.	427,167	39,422	466,589	20,666	149,428	19,796	373,157	596,908	103,397	—93,001
.....2 mos.	854	854,334	78,844	933,178	41,331	298,890	41,331	772,892	1,214,855	208,814	—148,943
Texas & New Orleans.....	Feb. 4,700	2,819,809	517,257	3,337,066	672,380	826,760	161,828	1,411,308	2,454,484	38,046	467,216
.....2 mos.	9,400	5,887,453	1,106,614	7,000,067	1,370,886	1,724,831	325,958	2,935,556	6,880,945	103,584	668,133
Spokane, Portland & Seattle.....	Feb. 555	347,915	36,395	384,310	47,667	78,085	10,966	158,562	320,182	18,474	55,670
.....2 mos.	1,110	734,351	86,324	820,675	100,217	164,629	22,341	335,927	673,568	36,674	101,402
Tennessee Central	Feb. 295	195,975	7,081	203,056	41,324	37,847	8,836	79,253	180,674	27,569	7,840
.....2 mos.	590	412,629	16,836	429,465	101,795	78,077	17,851	169,353	394,941	45,278	9,962
Terminal R. R. Assn. of St. Louis.....	Feb. 55	.....	.....	649,922	87,416	75,270	3,516	330,783	525,469	29,094	205,926
.....2 mos.	110	.....	.....	1,299,844	174,832	140,540	7,031	668,088	1,092,163	58,077	412,917
Texas & Pacific	Feb. 1,935	1,854,070	272,783	2,126,853	292,700	401,181	77,820	773,733	1,665,445	543,407	331,914
.....2 mos.	3,870	3,872,988	560,687	4,433,675	603,969	805,780	163,953	1,642,717	3,532,960	1,073,772	735,968
Texas Mexican	Feb. 162	64,530	1,655	66,185	12,985	14,317	3,592	36,203	74,330	2,775	—3,342
.....2 mos.	324	129,060	3,310	132,370	25,970	28,634	7,184	72,406	140,803	5,564	—2,141
Toledo, Peoria & Western.....	Feb. 239	115,972	71	116,043	18,049	11,327	13,775	38,783	98,011	16,469	6,228
.....2 mos.	478	249,432	136	250,568	35,445	25,189	28,872	95,625	204,292	41,239	4,067
Toledo Terminal	Feb. 28	.....	.....	85,814	5,588	11,894	575	36,044	59,103	12,545	54,842
.....2 mos.	56	.....	.....	179,744	11,271	26,700	1,150	76,464	125,481	25,930	73,497
Ulster & Delaware	Feb. 128	15,401	1,827	17,228	12,351	10,940	1,450	30,940	59,400	13,121	12,106
.....2 mos.	256	36,078	3,745	39,823	24,379	21,337	2,344	63,340	121,174	21,758	27,600
Union R. R. of Penna.....	Feb. 45	.....	.....	391,413	97,846	135,868	138	224,863	473,335	91,722	112,084
.....2 mos.	90	.....	.....	821,233	169,162	316,007	301	480,237	993,020	193,327	206,033
Union Pacific	Feb. 3,765	5,117,100	647,800	5,764,900	517,295	1,580,028	139,434	2,020,337	4,702,361	1,661,004	1,061,406
.....2 mos.	7,530	10,952,264	1,411,691	13,573,955	1,073,669	3,289,962	290,056	4,301,796	9,858,192	2,435,125	2,359,650
Oregon Short Line	Feb. 2,531	1,763,944	160,774	1,924,718	242,569	383,895	47,666	698,070	1,550,492	250,508	164,924
.....2 mos.	5,062	3,784,738	367,437	4,152,175	483,623	789,616	99,213	1,510,352	3,248,755	685,809	482,220
Oregon-Wash. R. R. & Nav. Co.....	Feb. 2,337	1,145,625	121,111	1,266,736	262,717	273,588	64,790	1,398,465	1,587,313	167,496	88,267
.....2 mos.	4,674	2,455,186	272,689	3,052,662	515,989	559,809	139,924	1,381,662	2,861,486	175,579	19,385
Los Angeles & Salt Lake.....	Feb. 1,246	1,143,474	179,141	1,322,615	289,671	281,462	62,775	514,095	1,278,803	23,604	93,176
.....2 mos.	2,492	2,439,446	415,126	3,226,206	613,498	588,181	131,106	1,087,525	2,684,691	144,673	298,502
St. Joseph & Grand Island.....	Feb. 258	238,258	3,854	242,112	25,826	29,611	3,339	78,955	154,053	76,496	79,688
.....2 mos.	516	485,356	8,338	510,157	55,193	65,317	7,104	167,976	330,509	142,899	137,927
Utah	Feb. 111	104,221	.....	104,221	16,978	34,182	363	26,155	83,065	15,156	18,695
.....2 mos.	222	.....	.....	208,442	33,944	77,363	723	52,316	169,860	36,111	49,459
Virginian	Feb. 561	1,106,712	14,233	1,120,945	125,149	250,777	13,388	271,576	498,213	353,185	430,733
.....2 mos.	1,122	2,475,668	31,560	2,507,228	254,031	500,554	26,521	580,061	1,452,943	1,038,213	1,543,558
Wabash	Feb. 2,523	3,271,388	307,839	3,579,227	265,430	670,681	182,226	1,870,423	3,215,635	527,006	506,214
.....2 mos.	5,046	6,867,992	601,880	7,469,872	543,987	1,319,615	362,569	3,740,733	6,513,086	1,461,528	936,119
Ann Arbor	Feb. 293	329,354	4,838	334,192	22,474	39,935	3,579	19,042	277,643	44,918	33,291
.....2 mos.	586	640,492	12,671	653,163	44,947	79,870	7,158	38,084	682,550	17,344	59,615
Western Maryland	Feb. 896	1,151,353	8,707	1,160,060	168,458	106,546	45,070	350,436	799,570	330,840	437,250
.....2 mos.	1,792	2,453,920	18,912	2,472,832	372,214	597,219	95,113	719,934	1,632,002	793,726	919,961
Western Pacific	Feb. 1,031	733,367	42,244	775,611	352,642	200,137	62,567	407,478	1,024,952	124,678	127,400
.....2 mos.	2,062	1,577,296	85,684	1,662,980	724,467	400,694	131,702	872,767	1,771,994	199,065	158,903
Wheeling & Lake Erie.....	Feb. 511	835,460	10,019	845,479	81,462	274,300	33,055	311,716	741,423	55,821	46,024
.....2 mos.	1,022	1,682,092	20,516	1,702,608	165,501	545,840	66,465	646,888	1,494,658	317,448	200,833
Wichita Falls & Southern.....	Feb. 203	4,670	289	4,959	19,447	17,369	2,555	39,740	89,031	4,513	430,626
.....2 mos.	406	9,413	578	9,991	38,894	34,738	5,110	79,480	188,373	7,867	2,734

News Department Continued on Next Left Hand Page

THE LOCOMOTIVE BOOSTER

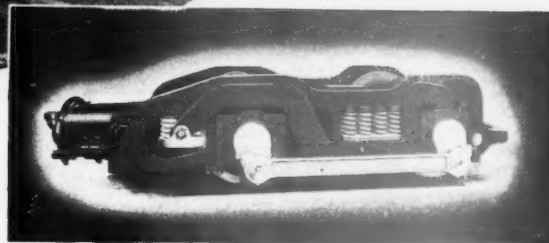


BOOSTERS have EARNED their excellent reputation...

BY CO-ORDINATING two Boosters with each main engine on three of their 2-8-8-2 type mallet locomotives, the Norfolk and Western Railroad has speeded up hump yard operations and eliminated the need for helper engines at their Portsmouth Terminal.

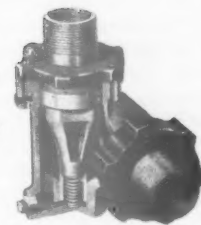
■ The 25% increase in power provided by the Booster moves longer trains over the hump without cutting. Yard congestion has been relieved, and an increase in tonnage from 75 to 95 cars or 9500 tons has resulted.

■ Such examples of Booster-power value are found wherever Booster-equipped locomotives are in service. By providing reserve power to speed up switching operations ... to start the heavy loads that road engines can haul at speed ... and to assure smooth starts and on-time passenger runs, the Booster has earned a definite place in every branch of railroad service.



THE FRANKLIN SLEEVE JOINT

Saves gaskets and lowers
maintenance



FRANKLIN RAILWAY SUPPLY CO. INC.

NEW YORK
SAN FRANCISCO

ST. LOUIS
MONTREAL

CHICAGO

NEWS

(Continued from page 729)

of the deficit occurring in 1930, of the Eastern lines resulting from the operation of the Maritime Freight Rates Act which calls for a 20 per cent reduction on freight hauled in and out of the Maritime provinces.

Premier Bennett inserted in the supply bill a provision that May 31 may be set as the final time limit for adjusting the accounts of the railway for the last fiscal year (the operating year of the C.N.R. ended on December 31 last and the fiscal year coincides with that of the government, namely, March 31), and this provision aroused criticism on the Liberal side of the House. Sir Eugene Fiset, a Quebec Liberal member, declared that the Prime Minister was proposing a serious legal departure from the provisions of the Audit Act which, he said, was the foundation of all government accounting.

There are indications that the Canadian National Railways will be the subject of many critical speeches in the Canadian Parliament this session. Already the members of the House are becoming inquisitive about the finances of the publicly-owned road, about the salary paid to the officers of the company and details as to the cost and profit derived from specific facilities.

N. Y. Shippers Conference Annual Dinner

Comparative costs of waterway and rail transportation and the natural destiny of the railways as all around transportation agencies, were among the subjects discussed by speakers at the annual dinner of the Shippers' Conference of Greater New York, held in New York City on April 7.

G. Metzman, manager, freight transportation, New York Central Lines, spoke on waterways. He compared the total costs, including interest and return on investment, of waterway transportation on the Mississippi and Ohio rivers, with rail transportation costs of carriers in the same territory. He also discussed highway competition and suggested that highway common carriers of passengers and freight be regulated and that contract truckers should likewise come under the same supervision. If such regulation existed, he continued, the element of discrimination and inequity affecting rail carriers would be removed and in addition the highway field would be equitable as between competing carriers operating therein.

The suggestion that the railways become all around transportation companies came from W. L. Batt, president of S.K.F. Industries, who held that "The alertness and openmindedness of progressive railway management will some day lead the railroads to a change in their present point of view. They will become transportation specialists, not merely railroads, and will assume the responsibility of taking freight from the shipping point to its destination in the quickest and most efficient way *** Such a broadening in the viewpoint of the

railroad is essential if it is to continue to fully meet our transportation requirements." Mr. Batt also discussed the advantages to be gained from the use of anti-friction roller bearings in standard railroad equipment.

Pullman Exhibit Arouses Much Interest

The Pullman Company has set up a complete single-occupancy sleeping-car section which is being displayed on the first floor of its building on Michigan avenue, Chicago, as a means of acquainting the public with Pullman accommodations, particularly the single-occupancy section. The window has been filled



with the original color drawings used for the company's advertising booklets which describe the operations of the Pullman Company, while the section is displayed at the rear of the room. A passenger agent and a porter are on duty all day to answer inquiries and explain the exhibit.

Bargain Fares in 1845

The Erie, in the year 1845—then the New York & Erie—proposed to passengers that if they would go in parties of five, buying five tickets, they would be brought back the same day free. With a desire to "meet the business wants of the citizens" the road also made various other offers, as shown below.

This information is found in a facsimile of a tariff on freight, issued in 1845, which is shown in the Erie Railroad Magazine for April. In 1845, the road, with its eastern terminus at Piermont, extended westward as far as Middletown, N. Y., about 50 miles.

This tariff, in which all ordinary freight commodities are embraced within 29 items, filling half the tabular form, and showing live stock and provisions taking up about the same amount of space in the other half, contains the passenger information in footnotes, as follows:

PASSENGER RATES SHOWN AS FOOTNOTES ON A FREIGHT TARIFF

Passengers to New York can procure tickets at the following rates: From Middletown, \$1.75; New Hampton, \$1.62½; Goshen, \$1.50; Chester, \$1.40.

Merchants, grocers and others receiving freight regularly by the railroad, the charges on which amount to one hundred dollars or more per annum, can procure a commutation ticket for ten dollars per quarter, giving the person named thereon the free use of the road.

Farmers sending 20 gallons of milk per day, may commute.

Farmers or others going to market with their own produce, the charges on which amount to five dollars or more, can procure a free ticket to return, and if the charges amount to ten dollars, free tickets both ways will be given.

Families and parties can procure tickets to New York and return the same day, as follows: For both ways, from Middletown, \$2.50; New Hampton, \$2.37½; Goshen, \$2.25; Chester, \$2.00,

but the tickets cannot be used returning on any other day, without the payment of the difference between this and the regular rates for single tickets.

Families or parties paying for five or more tickets to any depot or station upon the line of the road may return the same day free; or if the tickets are for the evening train they may return by the next morning train on the same conditions.

The above provisions in relation to passages free or by commutation have been made with a desire to meet the business wants of the citizens of Orange County, and it is hoped that the usefulness of the road will be promoted thereby. A general reduction of the present low rates charged upon the road, it is feared, would prove injurious to both stockholders and the public. During the close of navigation below the Highlands, the full rates will be charged. No departure from the above terms.

June, 1845.

Club Meetings

The Western Railway Club will hold its next meeting on Monday evening, April 20, at the Hotel Sherman, Chicago. A. J. Schafmayer, chief engineer of the Board of Local Improvements, Chicago, will speak on the Chicago subway project; Alfred Brahdy, resident representative of Robert Ridgeway, chief consulting engineer for the Chicago subway, will speak on subway design and construction, and Harold A. Otis, engineer in the car department of the Chicago Rapid Transit Company, will speak on Chicago subway car equipment.

The Toronto Railway Club will hold its April meeting at the Royal York Hotel, Toronto, on Monday evening, the 20th (one week later than the regular date). D. Crombie, chief of transportation of the Canadian National, will address the meeting on "Some Other First Things."

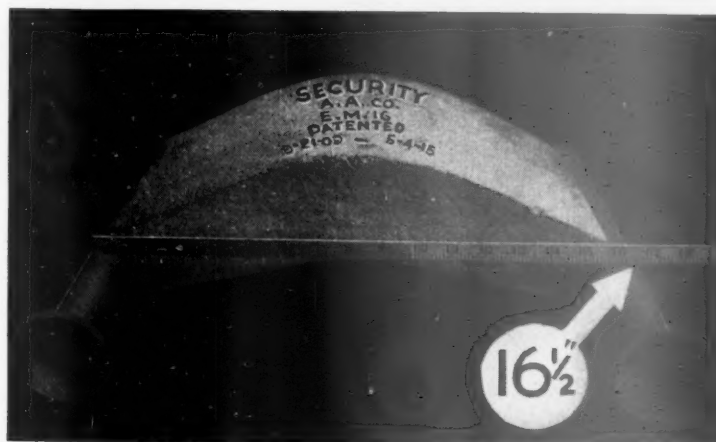
The Transportation Club of San Francisco has elected officers for the ensuing year as follows: President, Ross C. Bray; first vice-president, W. G. Tawse; second vice-president, L. R. Everett; secretary-treasurer, C. E. Donaldson.

The St. Louis Railway Club, at its meeting on April 10, elected the following officers for the ensuing year: President, William E. Hicks, assistant to the manager of the department of personnel of the Missouri-Kansas-Texas; first vice-president, John W. Rea, general superintendent of the Missouri Pacific; second vice-president, D. L. Forsythe, general road foreman of equipment of the St. Louis-San Francisco; third vice-president, Thomas M. Hayes, assistant to the president of the Wabash; and secretary-treasurer, B. W. Frauenthal, general traffic agent of the St. Louis Public Service Company, re-elected.

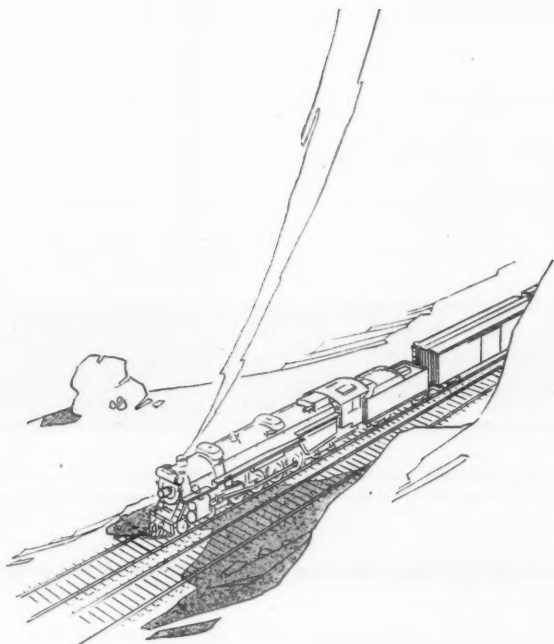
Cost and Yield of Railway Securities

The cost to the railroads of the capital raised by the sale of bonds under authorization of the Interstate Commerce Commission, from 1920 to December 31, 1930, averaged 5.48 per cent and the average yield to the public purchasers of the bonds was 5.25 per cent; while the average spread between the prices paid to the railroad companies by bankers and the prices at which the bonds were distributed was 2.43 per cent of par, according to a computation furnished to the commission for its information by the accounting department of the Baltimore & Ohio, analyzing railway security sales

Continued on Next Left Hand Page



How An Industry Was Standardized



The part of the American Arch Company
in elimination of waste thru standardization

WHEN THE American Arch Company started its standardization of Arch Brick practice, tube spacing varied between wide limits; sizes and shapes of Arch Brick were numerous. Often a storehouse had plenty of Arch Brick but none to fit the engine that needed it.

Systematically the American Arch Company urged standardized arch tube spacing; the regular cleaning of Arch tubes to reduce failures; proper facilities for Arch Brick storage.

Going further, the American Arch Company designed its famous "Sled-runner" and "Bevelled End" brick, thus eliminating two thirds of the side brick patterns and one-half the middle brick patterns. In short, the American Arch Company organized on an efficient basis the supplying of Arch Brick to the country's railroads.

For 20 years this work has gone forward. It has a value to the railroads.

THERE'S MORE TO SECURITY ARCHES THAN JUST BRICK

**HARBISON-WALKER
REFRACTORIES CO.**
Refractory Specialists



AMERICAN ARCH CO.
INCORPORATED
Locomotive Combustion
Specialists » » »

since the commission was given regulatory power over them in May, 1920. This brings up to date a table published in the commission's annual report.

Under these authorizations a total of \$3,380,967,000 of bonds were sold, omitting amounts under \$100,000, and the weighted average cost to the roads was 5.48 per cent, having been reduced from 7.5 per cent during the seven months' period in 1920 after this part of the law became effective, to 4.73 per cent in 1928, and then having increased to 5.2 in 1929 and 4.9 in 1930.

The average yield to the public decreased from 7 per cent in 1920 to 4.77 per cent in 1930. The spread was 3.47 in 1920 and 4.54 in 1921 but has been gradually reduced to 2.43 in 1930.

During the same period a total of \$1,053,821,000 of equipment trust certificates was sold at an average cost to the railroads of 5.29 per cent and an average yield to the public of 5.015 per cent.

In 1920 the average spread in the price to the bankers and to the public was 1.91. In 1922 it increased to 2.33, after which it was gradually reduced to 1.47 in 1926. In July, 1926, the commission began the practice of requiring competitive bids on equipment certificates and for the next four years the average spread was 0.66, 0.64, 0.89, and 0.78. During the same period the roads issued \$1,412,087,501 of stock and \$319,481,243 of miscellaneous obligations, in addition to 5,118,376 shares of no-par stock.

Motor Vehicle Registrations and Fees Increase Slightly

Registrations of passenger motor vehicles for 1930 showed a decrease from the 1929 figures, but motor truck registrations increased enough to make a slight gain of 0.08 per cent in total motor vehicle registrations for the year, according to reports of the 48 states and the District of Columbia to the Bureau of Public Roads, U. S. Department of Agriculture. Registered automobiles, taxis and buses numbered 23,042,840 for the year, a decrease of 78,749 vehicles from the 1929 figures of 23,121,589; the registration of 3,480,939 motor trucks and road tractors showed a gain of 101,085 over the 1929 figures. The total registration of passenger vehicles and of motor trucks for the year amounted to 26,523,779, as against 26,501,443 in 1929.

The States and the District of Columbia collected in registration fees, licenses and miscellaneous taxes in 1930 a total of \$355,704,860, which is \$7,861,317 more than they collected in 1929.

In addition to passenger vehicle and motor truck registrations, 41 states reported a registration of 262,507 trailers, which is a gain of 69,463, or more than 36 per cent, over the 1929 figures. This gain in trailers is the largest made in any one year as compared with a previous year since the bureau began to compile detailed registrations in 1921.

After deducting \$19,196,926 for collection and administration expenses and \$9,473,671 for miscellaneous items provided by various state laws from the total revenue collected of \$355,704,860, the

states apportioned the remainder to the construction and financing of state and local roads in the following amounts; \$222,146,682 for state roads; \$68,577,899 for local roads; and \$36,309,682 was applied to state and county road bond indebtedness. Some of the purposes for which the miscellaneous funds were spent included refunds stipulated by law; state highway patrol; city streets; and general funds of cities and states.

Union Pacific Employees Save Their Lives and Limbs

The Union Pacific has devoted practically the entire contents of the April issue of its employees' magazine to the subject of safety. The various articles, which were written by officers and employees, reveal interesting facts regarding the prevention of death and bodily injury on that System.

On the Union Pacific Railroad, the casualty rate for employees on duty, in the year 1930, was 1.97 per million man-hours, as compared with five per million man-hours in 1923, a reduction of 60 per cent. These and other data appear as below:

	Casualties Per Million Man-Hours		Reduction p. c.
	Last Year	Earlier Year	
U. P. R. R.	1.97	(1923) 5.00	60
O. W.	1.94	(1922) 11.92	
O. W., sec. div.	0.59		
O. S. L.	2.62	(1921) 17.75	
L. A. & S. L.	1.32	(1913)	95

On the whole Union Pacific System a total of 845 foremen completed in 1930 a record of seven consecutive years without an accident of any sort to any of the employees in their respective departments, while 228 additional foremen had six-year records; 198 five-year records, 331 four-year records, 355 three-year records, 340

two-year records, and 347 one-year records, making a grand total of 2,644 foremen with records of not a single accident to any of their employees during periods of from one to seven years. The Los Angeles & Salt Lake has not recorded a single fatality to a trainman, engineman, trackman, bridge and building man or shopman since December 1, 1928.

During the construction of the Union Passenger Terminal at Omaha, where 90 per cent of the workmen had never before worked for a railroad, where an active accident-prevention campaign was in effect, and where practically all hands had to work on, under or over and between the eight tracks serving the original station and over which there were 360 engine movements during the eight-hour working period every day, not a single passenger, switchman or station employee was injured; and in that 20 months of activity there were only 10 injuries to employees of the construction forces.

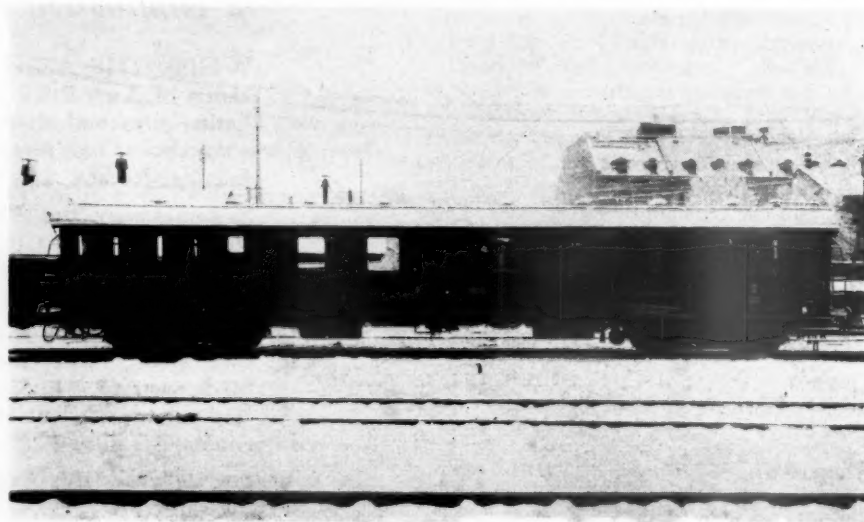
Pocatello enginehouse forces at the end of 1929 had a record of 308 days clear and in 1930 had 365 days, or a total record to and including February 28, 1931, of 732 days without a lost time or reportable injury to employees in this department.

Up to February 1, 1931, no employee in the car department at Los Angeles had sustained a lost time or reportable injury since August 3, 1928.

At Omaha in 1910 there was an average of 50 personal injuries a month in the locomotive shops but during the past year there was an average of only four; and these were of a minor character.

The Salt Lake division of the Los Angeles & Salt Lake has had no reportable injuries to trackmen since September 17, 1929, and during this period has had but two minor lost-time injuries.

* * * *

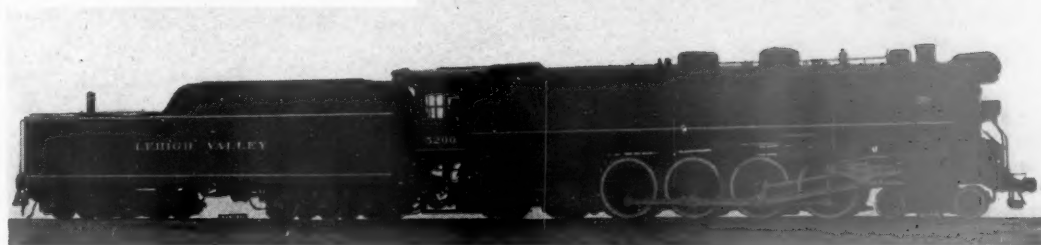


The Latest Type of Second Class Passenger Car to Be Put in Service on the Swiss Federal Railroads

This new second class car, entirely constructed of steel and iron, has recently been put in service by the Swiss Federal Railways. It is equipped with triple springs, and in spite of a trial speed of some 65 m.p.h., there was no vibration whatever. The new car is 65.62 ft. long, has 48 seats and weighs 41 tons. It can be heated electrically or with steam and has exceptionally swift-acting brakes. Instead of the customary two seats on each side of the aisle, this car has only three seats; i.e., one seat on one side and two on the other. The interior equipment consists of paneling in dark oak and cherry wood, with plush upholstery in shaded blue. The double ceiling is of a light color, and eight large ventilators provide an abundant circulation of fresh air. Every seat has a 40-watt shaded electric light with individual switch. Two blue lamp-function automatically at night. Improved luggage racks are another innovation. It is expected that 18 cars of this latest type, a product of the car and elevator factory at Schlieren, near Zurich, will be put into service this year.

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Alco Built



BUILT FOR THE LEHIGH VALLEY

Weight on Drivers, 268,000 pounds; Weight of Engines, 422,000 pounds; Cylinders, 26 x 32 inches; Diameter of Drivers, 70 inches; Boiler Pressure, 255 pounds; Maximum Tractive Power with Booster, 85,060 pounds.

FROM 1925 to 1929 only slightly more than 2500 new locomotives were purchased for freight service by Class I railroads, amounting to not more than 9 percent of the freight locomotives in service at the end of that period.

No locomotive built prior to 1925 possesses all the capacity and economy-increasing factors which have been built into the locomotives acquired by the railroads since that time. And yet, in spite of this, replacement since 1925 has gone on only at a rate of less than 2 percent.

A more liberal retirement and replacement program will reduce operating expenses now. It would also assure greater net earnings when gross revenue increases.

Obsolescence exacts a high tribute.

American Locomotive Company
30 Church Street **New York N.Y.**

Foreign

Car Builders' Cartel Transformed into Limited Company

The International Cartel of Railway Car Manufacturers will be transformed into a limited company in order to give the organization a judicial standing and obviate the inconvenience of periodic renewals, the Department of Commerce has been advised in a report from Brussels, Belgium. The members of the cartel will take a proportionate share in the company under their own names rather than under the name of the national group. The amount of capital and the headquarters of the company have not yet been fixed, but it is presumed that it will be established as a French limited company with a main office in Paris.

It has been decided at a Paris meeting that the German export quota would be increased. France will hand over part of its orders to Germany under certain conditions and will possibly finance the railroad car orders passed in Germany. It is also reported that some countries that were not members of the cartel have asked for admission.

South African Railways, 1929-1930

Net income from railways, after depreciation and interest charges, of £63,491, equivalent to \$308,566, is shown by the report of the Railways and Harbors Administration of the Union of South Africa for the fiscal year ending March 31, 1930. This compares with a net of £766,527, or \$3,725,321, for the preceding year, the decrease of \$3,416,755 being largely accounted for by substantial increases in operating expenses, depreciation and interest, while revenues remained almost constant. A comparative income account for the two years, considerably condensed, is presented in the following table:

	1929-1930	1928-1929
Operating revenues.....	\$126,994,468	\$126,800,860
Operating expenses....	92,283,166	91,361,507
Depreciation	9,186,533	7,290,000
Total expenses.....	\$101,469,699	\$98,651,507
Net railway operating income	\$25,524,769	\$28,149,353
Miscellaneous receipts and charges (net)...	784,972	461,992
Interest charges.....	26,001,175	24,886,024
Net income	\$308,566	\$3,725,321

The year's revenues represented an increase of £39,837 (\$193,608), over those for 1928-1929. Freight traffic, including coal and livestock, yielded about 73 per cent of the total; while passenger income dropped slightly in relative importance. A detailed summary of revenues is as follows:

	1929-1930	1928-1929
Passenger	\$26,373,616	\$26,956,063
Baggage	3,380,937	3,255,724
Freight (exclusive of coal and livestock)...	70,798,429	70,705,617
Coal	18,923,163	18,553,283
Livestock	2,962,904	2,982,529
Other traffic	863,909	793,332
Miscellaneous revenue..	3,691,510	3,554,312

Total revenue.....\$126,994,468 \$126,800,860

Expenses, on the other hand, rose by

£189,642, or \$921,659, largely because major increases in operating and "traffic" expenditures, the two leading expense classifications, more than nullified savings of \$386,575 in maintenance costs. Expenses for the year under review and the one immediately preceding are shown in detail below:

	1929-1930	1928-1929
Maintenance of way and structures	\$13,899,483	\$14,224,438
Maintenance of equipment	21,539,967	21,601,587
Operating	26,582,300	25,859,710
Traffic	22,580,804	22,195,416
Executive	2,673,991	2,578,920
Obsolescence	2,705,115	2,663,212
Trucking	2,301,506	2,238,224
Total expenses.....	\$92,283,166	\$91,361,507

The year's operating ratio, 79.90, was above the 1928-1929 figure of 77.80, but compares more favorably with ratios of 79.83 and 80.68 for 1927-1928 and 1926-1927 respectively. Similarly, net railway operating income, while well below that for 1928-1929, is more closely in line with the corresponding figure for the three years next preceding, a summary of revenues and expenses, including depreciation, for the past five years being as follows:

Fiscal year ending March 31	Gross revenues	Operating expenses	Net railway operating income
1930	\$126,994,468	\$101,469,699	\$25,524,769
1929	126,800,860	98,651,507	28,149,353
1928	122,981,430	98,172,039	24,809,391
1927	117,093,666	94,464,680	22,628,986
1926	117,375,838	91,053,680	26,322,158

As noted in the income account above, however, interest charges, which have increased steadily in recent years, and which, in 1929-1930, amounted to \$1,115,151 more than in 1928-1929, actually exceeded net railway operating income, so that the railways were able to show a net profit, after interest, only by virtue of an increase in miscellaneous receipts.

Traffic and operating statistics for the year under review show that a total of 80,532,855 passengers were carried, the decrease of 1,461,662 as compared with 1928-1929 being more than accounted for by the closing, on April 17, 1929, of the Sea Point suburban line, with an attendant loss of 2,701,691 passengers. "Apart from this, however," the report states, "the upward trend of passenger traffic, which had been in evidence since 1921-1922, received a decided check, due to the greater use of road motor transport by the traveling public.... The most disquieting feature is the falling off in main and branch line bookings." Exclusive of excursion traffic, trips of this nature declined by 545,687, with a consequent revenue loss of \$561,034; while suburban traffic, exclusive of the Sea Point line, showed an increase of 1,782,546 passenger journeys, the largest individual increases being reported by lines in the vicinity of Capetown, Johannesburg, Durban, Pretoria and Bloemfontein, with serious losses only at Port Elizabeth and Milnerton. Of the 517,983 passenger trains run during the year, 372,261 were in suburban service, 76,940 were mixed trains, and 5,427 were rail motor cars. Passenger train mileage, including that run by mixed trains, totaled 19,726,501, an increase, despite the smaller number of passengers carried, of 555,586 train-miles over the corresponding figure for 1928-1929.

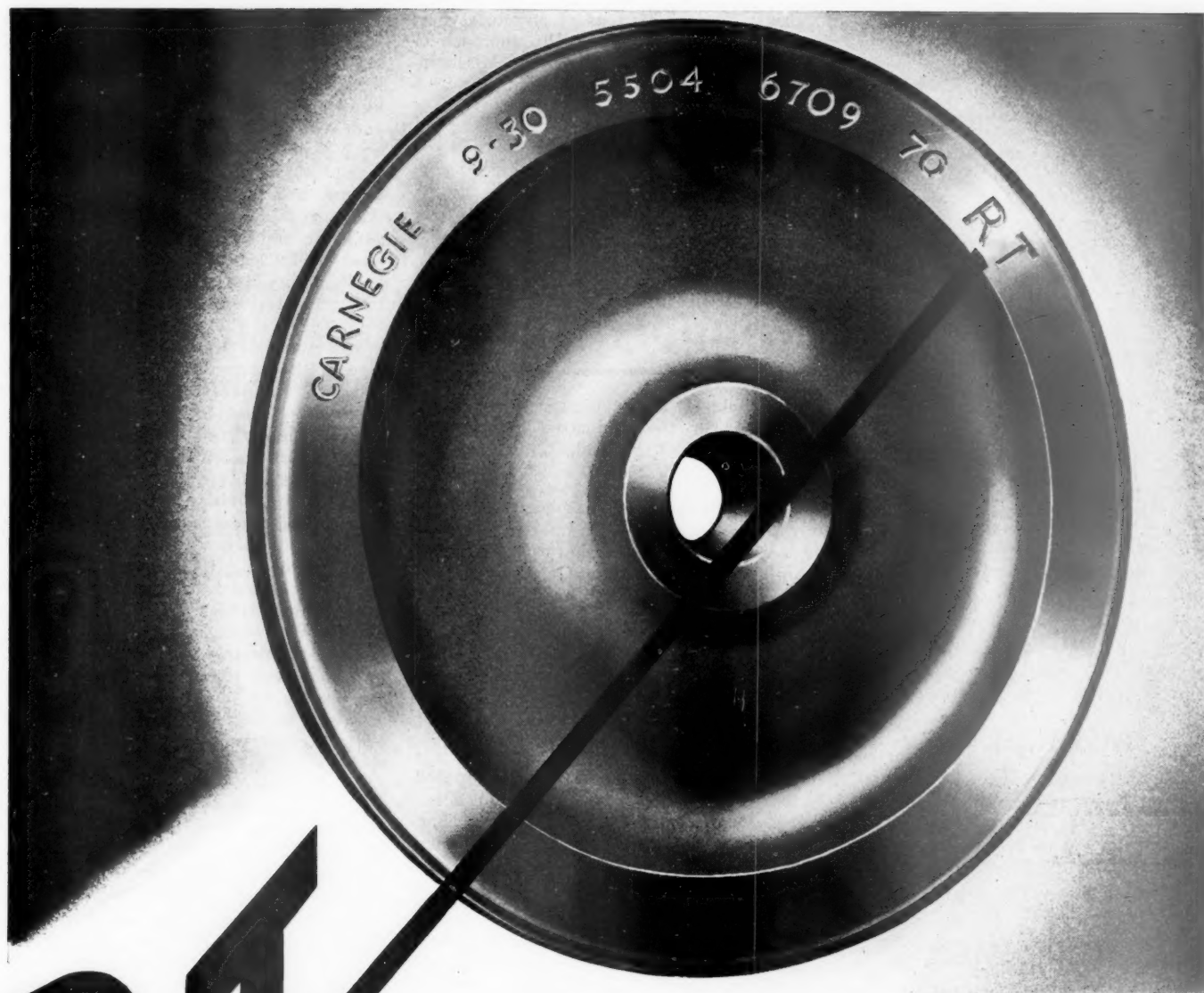
Coal continues to be by far the most important type of freight moving on the South African Railways, 9,930,129 tons being handled in 1929-1930, as against 3,762,121 head of livestock and 12,584,837 tons of all other commodities, which included 5,188,133 tons of agricultural products, 1,685,603 tons of minerals and ores other than coal, 1,609,652 tons of general merchandise, and 1,186,292 tons of building materials. Livestock and building materials moved in considerably smaller volume than in the preceding fiscal year, but other major traffic classifications showed substantial tonnage improvements. Exclusive of mixed services, freight trains, which had an average net load of 197 tons (201 tons in 1928-1929), traveled a total of 30,657,958 miles and produced a total of 5,002,432,292 revenue ton-miles, the average haul per ton of revenue freight being 219 miles (227 miles in 1928-1929). In addition, 4,508,526 tons of company freight were handled a distance equivalent to 1,673,270,652 ton-miles.

Lines open to traffic on March 31, 1930, included 12,027 miles of 3 ft. 6 in. gage and 896 miles of 2 ft. gage, while equipment in service (exclusive of 1,200 units for 2 ft. gage) included 2,098 steam and 95 electric locomotives, 3,668 passenger cars and 37,546 freight cars, representing a total capital investment of £142,378,617 (\$691,960,079). Employees, of whom 53,250 were Europeans, numbered 82,164, a decrease of 2,241 from the preceding year. Revenue averaged \$9,914 per mile of open line and \$2.49 per train mile, while operating expenses, on the same basis, were \$7.922 and \$1.99, respectively.

Despite the abandonment, during the year, of 38 routes aggregating 1,117 miles, the highway services operated by the S. A. R. showed a substantial growth, the total route mileage rising from 9,285 in 1928-1929 to 11,295 in 1929-1930. Some 900 Europeans were employed during the year under review in operating 47 motor coaches, 89 trucks, 23 trailers and 291 combination freight and passenger vehicles, which ran a total of 5,286,555 miles and carried 2,318,537 passengers, 168,422 tons of freight and 974,461 gallons of cream. Revenues totaled £402,280 (\$1,955,081), while expenses amounted to £448,342 (\$2,178,942), leaving an operating deficit of £46,062, or \$223,861, which compares with a deficit of £3,134 (\$15,231) in 1928-1929. The larger loss, in the face of rapidly increasing traffic, was due, the report states, to "(a) Competition from private carriers; (b) increased maintenance costs; (c) operation of developmental services, and (d) 'one-way' traffic."

The Motor Carrier Transportation act, passed by the South African Parliament in June, 1930, provided for the regulation, by a Road Transportation Board, of all common carriers by highway. Designed to promote safety and standard service conditions, and to avoid duplication of facilities, this act ranks as one of the year's outstanding developments, and is expected to mitigate the effects of highway competition from which the South African Railways—in common with others elsewhere—have suffered keenly in the last few years.

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... the Mark of EXTRA SERVICE

The ever-increasing weight and speed of modern transportation throw a tremendous burden on equipment, particularly on wheels. To meet this condition, we are now prepared to furnish special heat treated wrought steel wheels for passenger, engine truck and locomotive tender service; also heat treated wheels for electric railway service, and single and double flanged crane wheels. The process of heat treatment, varying for different types of service, produces a wheel with an especially tough rim and with high physical properties—a wheel that is highly resistant to wear.

"R T" stamped on your wheels means Rim-Toughened. It indicates the additional refinement of heat treatment. It is the mark of extra service—of extra stamina to endure the heavy loads of present-day transportation.

Our wheel engineers are at your service.

CARNEGIE WROUGHT STEEL WHEELS

Product of Carnegie Steel Company, Pittsburgh, Pa.



Subsidiary of United States Steel Corporation

115

Equipment and Supplies

LOCOMOTIVES

THE BUSH TERMINAL COMPANY has ordered from the Ingersoll-Rand Company seven 55-ton oil-electric locomotives for use in switching service in its Brooklyn yards. Each locomotive will be powered by an Ingersoll-Rand 300-hp. Diesel engine and all the electrical equipment will be furnished by the General Electric Company. The delivery of this order will bring to more than 100 the total of locomotives of this type and manufacture in use by railroads and industries.

FREIGHT CARS

THE MINNEAPOLIS & ST. LOUIS has ordered 100 flat cars of 50 tons' capacity from the General American Car Company.

THE SHEFFIELD FARMS COMPANY, New York, has ordered 12 new milk tank cars of 6,000 gal. capacity from the General American-Pfaudler Corporation, Chicago.

PASSENGER CARS

THE MINNEAPOLIS & ST. LOUIS has ordered four gas-electric rail motor cars from the St. Louis Car Company. The cars will be equipped with Electro-Motive Company power plants, three of which will be of 400 hp. and one of which will be of 300 hp.

IRON & STEEL

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 500 tons of structural steel for a viaduct at Merced, Cal.

THE CLEVELAND UNION TERMINAL is inquiring for 300 tons of structural steel for its Lorain Avenue bridge at Cleveland, Ohio.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered 100 tons of steel for a bridge at Providence, R. I., from the Boston Bridge Works.

THE CHICAGO & NORTH WESTERN has ordered 300 tons of structural steel for a bridge at Wyeville, Wis., from the American Bridge Company.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 385 tons of structural steel for a bridge at Davenport, Iowa, from the McClintic-Marshall Company.

THE PENNSYLVANIA has ordered 250 tons of steel for a bridge at Canton, Ohio, and 700 tons for a bridge at English Lake, Ind., from the American Bridge Company.

THE INDIANA HARBOR BELT has ordered 2,000 tons of structural steel for track elevation work at Bellewood, Ill., from the Mississippi Valley Structural Steel Company.

THE ST. LOUIS BOARD OF PUBLIC SERVICE

has ordered 7,000 tons of structural steel for the East St. Louis, Ill., approach to the Municipal bridge from the Mississippi Valley Structural Steel Company at a cost of \$434,000.

THE WESTERN PACIFIC has ordered 925 tons of structural steel for use at San Francisco, Cal., allotting 500 tons to the American Bridge Company, 300 tons to the McClintic-Marshall Company and 125 tons to the Virginia Bridge & Iron Company.

Supply Trade

Harold H. Perry, vice-president and a director of the Industrial Brownhoist Corporation, Cleveland, Ohio, has resigned.

William G. Praed has been appointed radiograph engineer in charge of a new commercial X-ray laboratory installed by the Claud S. Gordon Company at 2416 West Fifteenth place, Chicago.

John L. Cohill, assistant export manager of the Firestone Tire & Rubber Company, has been appointed vice-president and general manager of Firestone de la Argentina; he will have charge of Firestone operations in Argentina.

George G. Landis has been promoted to chief engineer of the Lincoln Electric Company, Cleveland, Ohio. The company has moved its Chicago office from 53 West Jackson boulevard to larger quarters at 1455 West Thirty-seventh street.

The Ingot Iron Railway Products Company, which handles the sales of corrugated metal culverts, spiral welded pipe and metal cribbing to the railroads for the American Rolling Mill Company, Middletown, Ohio, has opened a district sales office at 1120 Midland Bank building, Cleveland, Ohio. J. M. Harrod is the district sales manager.

The Armco Railroad Sales Company, which handles the sales of wrought steel wheels, locomotive jacket sheets, car siding sheets and plates, and galvanized black and blue annealed sheets to the railroads for the American Rolling Mill Company, Middletown, Ohio, has opened a district sales office at 1120 Midland Bank building, Cleveland, Ohio. W. N. Crout is the district sales representative.

James W. Welsh has opened an office as consulting engineer with headquarters at 393 Seventh avenue, New York City. Mr. Welsh who resigned recently as assistant to Joseph H. Alexander, president of the Cleveland (Ohio) Railway Company, had previously been affiliated as an engineer with the Pittsburgh Railways, transportation engineer for the Emergency Fleet Corporation during the war and later as executive secretary of the American Electric Railway Association.

Charles R. Vanneman, chief engineer of the New York State Public Service Commission, has resigned that position

to become president of a corporation he has formed for the general practice of engineering, particularly as it affects public utilities. The corporation is to be known as Charles R. Vanneman, Inc., and will have its headquarters in the State Bank building, Albany, N. Y. The vice-president is to be Newell L. Nussbaumer and the treasurer, Ray P. Diehl, both of Buffalo. Mr. Vanneman is a graduate of Cornell University in the class of 1903 and has been engaged in public utility work of varied kinds since 1907. His railroad experience was on the Pennsylvania where he was an engineer in the roadway department. In the service of the state of New York, he has acted as examiner for the Civil Service Commission and acting chief examiner. In 1910 he was appointed inspector of steam railroads for the Public Service Commission. He was then successively chief of the division of transportation, engineer of grade crossings, chief of the division of steam railroads and (1921) chief engineer. In this latter office, he has had charge of the varied activities of the Public Service Commission in connection with steam and electric railroads, gas, steam, electric and telephone plants, bus lines, and the elimination of grade crossings. In this latter field, he was active in securing the enactment of the present grade crossing law of the state, which is notable as embodying the largest state appropriation in this field on record—three hundred million dollars. Mr. Vanneman is well known throughout the state of New York as well as in Pennsylvania and elsewhere. He is president of the Albany chapter of the New York State Society of Professional Engineers and president of the Albany Young Men's Christian Association. Messrs. Nussbaumer and Diehl have been actively engaged in municipal engineering work in Buffalo and vicinity. George C. Diehl, Inc., now engaged in work of this kind in Niagara Falls, Tonawanda and other cities, will turn this work over to the new corporation.

P. G. Jenks, vice-president and director of the Entreprises Industrielles Char-entaises at La Rochelle, France, has been elected president of the Pullman-Standard Car Export Corporation which has been recently organized in order to concentrate in one directly-owned subsidiary of Pullman, Inc., the export business from domestic plants and the ownership of the foreign plants. The new company includes the Middletown Car Company, a subsidiary of Standard Steel Car Corporation, the latter is now a direct subsidiary of Pullman, Inc., and the officers of the Middletown company become officers of the new company. The officers of the Pullman-Standard Car Export Corporation are as follows: President, P. G. Jenks, who succeeds Patrick Joyce; vice-presidents, R. L. Gordon, who is also vice-president of the Standard Steel Car Company; S. A. Webb, who was vice-president of Middletown; L. E. Young, who was vice-president of Middletown; H. M. Sloat, who was vice-president of Middletown; T. C. Ashenfelder, who was vice-president of

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Hours by sled— minutes by rail—

Far into the north
woods the steel rails go
to bring out the timber
—winter or summer—
swiftly and economic-
ally on Gary Wrought
Steel Wheels.



Illinois Steel Company

Subsidiary of United States Steel Corporation

General Offices: 208 South La Salle Street, Chicago

Middletown; controller, **H. M. Dudley**, who is also controller of the Standard Steel Car Company; secretary, **William Bierman**, who is also secretary of the Standard Steel Car Company; and treasurer, **C. L. Spence**, who is also treasurer of the Standard Steel Car Company. Mr. Jenks was born in Philadelphia, Pa., where he was educated in the public schools. During the early part of his career he was employed as secretary to the general manager of the Adams Express Company, as treasurer of the Pressed Steel Car Company, as general manager of the Western Steel Car & Foundry Company and as a member of the firm of Banning, Cooper & Company, Pittsburgh, Pa. From 1912 to November, 1923, he was assistant to the president of the Standard Steel Car Company at Chicago, while during the war, from 1917 to 1919, he was general



P. G. Jenks

manager of the ordnance department of the Hammond plant at Hammond, Ind. In 1923 he was elected a vice-president and a director of the Standard Steel Car Company, while in 1930 he was elected a vice-president and a director of the Enterprises Industrielles Charentaises. On March 12, 1931, he was elected president of the Pullman-Standard Car Export Corporation.

OBITUARY

Beverly L. Worden, president of Cutler-Hammer, Inc., Milwaukee, Wis., died on March 28, at West Orange, N. J. He was born in Chicago on February 8, 1871, and graduated from the University of Wisconsin in 1892. In the same year he entered the employ of the Wisconsin Bridge & Iron Company, Milwaukee, Wis., where he was employed in various capacities until 1902. He resigned from the Wisconsin Bridge & Iron Company on that date to become associated with the Worden-Allen Company, Milwaukee. In 1912 he founded the Lackawanna Bridge Company, Buffalo, N. Y., but still retained the presidency of the Worden-Allen Company. A few years later he purchased the Ferguson Steel & Iron Corporation of Buffalo, N. Y. In 1917 Mr. Worden was in charge

of the construction of the Submarine Bolt Corporation's shipyards at Newark, N. J. and later directed the construction of 150 steel ships for war emergency use. In 1922 he became president of the Beaver Board Company, an affiliated



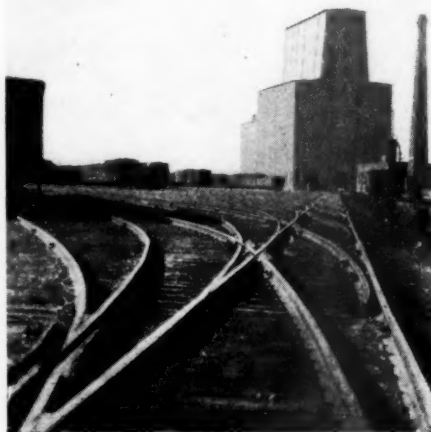
Beverly L. Worden

company, and in March, 1923, was elected vice-president of Cutler-Hammer, Inc. In June, 1924, he was elected president which position he held until his death.

TRADE PUBLICATION

TRUCK WHEELS.—A 23-page, illustrated bulletin has been issued by the Metzgar Company, Inc., Grand Rapids, Mich., describing end-wood wheels and casters for application to warehouse trucks, trailers and other material-handling devices. This line includes wheels for heavy loading, as well as for light weight containers, and the bulletin sets forth 14 features of the wheels, as follows: Floor protection, durability, quietness, capacity, easy rolling, shock absorbing, long service, economy, weather-proof, non-corroding, self-lubricating and sparkless. The wheels are all roller-bearing equipped.

* * *



The Classification Yard of the Peoria & Pekin Union at Peoria, Ill., is Equipped with Lap Switches and Self-Guarded Frogs

Construction

ATCHISON, TOPEKA & SANTA FE (Elkhart & Santa Fe).—A contract for the construction of 59 miles of new line between Felt, Okla., and Clayton, N. M., and between Mt. Dora, N. M., and Gladstone, has been awarded to the Sharpe & Fellows Construction Company, Los Angeles, Cal. The contract covers the construction of the line complete, including grading, bridging, track laying and ballasting, and buildings.

ATCHISON, TOPEKA & SANTA FE.—A contract has been awarded to Arthur & Allen, Pueblo, Colo., for the grading for the rearrangement of about two miles of line east of Pueblo, and for the construction of the concrete substructure for a highway subway under this railroad's tracks at Portland avenue in East Pueblo. This project also includes the construction of a new bridge over the Fountain river at Pueblo, the foundation work for which has been practically completed. Placing of the steel superstructure of the Fountain River bridge and track work in the line rearrangement will be undertaken by company forces.

DULUTH, SOUTH SHORE & ATLANTIC.—The general contract for the construction of a new steel ore dock, and timber and steel approach, at Marquette, Mich., which will have an estimated capacity of 47,250 tons, has been awarded to the Merritt, Chapman & Whitney Corporation, Duluth, Minn. Work on the structure will start immediately and will be completed for handling the 1932 ore movement. The total cost will be \$1,500,000.

INDIANAPOLIS UNION.—A contract for the construction of overhead viaducts over the tracks of this company at South Meridian street and Bluff road at Indianapolis, Ind., has been let to the Cunningham Construction Company, Indianapolis. The cost, about \$60,000, will be borne by the railroad, the city and Marion county.

LEHIGH VALLEY.—The New York Public Service Commission has designated for elimination the East Rush road crossing of this company's tracks in Rush, N. Y. The elimination will be accomplished by carrying the highway under the grade of the railroad.

LOUISVILLE & NASHVILLE.—This company has requested bids, which are due on April 15, from eight contractors, for the construction of the piers and abutments, for a new bridge over the Ohio river at Henderson, Ky. The bridge will include four 500-ft. spans and one 675-ft. channel span. Approaches to the bridge, for which plans have not yet been fully developed, will be subject to a subsequent contract letting. The approximate cost of constructing the new bridge, including approaches and dismantling of the old bridge, which is located a short distance upstream from the new site, will be \$6,500,000.

NORFOLK & WESTERN.—Authority has been issued by this company for the con-

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TIGER WELD SIGNAL BONDS

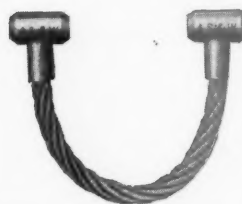
THESE signal bonds are designed along new and improved lines. They enable the welder to make a perfect installation. For example—there are no wires to be welded on the job. This has already been done by the manufacturer.

The cylindrical solid steel terminal gives a large contact area and also enables the bond to be placed at any convenient angle. Installation can be made by either the oxy-acetylene flame with flux wire or by arcwelding with steel electrode. Write us for samples and detailed information.

A PERFECT WELD EVERY TIME



Type BW-2 for use on reinforced splice bars with widely projecting rib.



Type BW-1 for use on splice bars which permit using U shaped bonds.

1831



1931

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

And All Principal Cities

Export Distributors: United States Steel Products Company, New York

Financial

struction of a new abutment on the west end of bridge No. 2067, near Perintown, Ohio. This authority also covers the rebuilding of part of the east abutment of the same bridge, and the raising of abutments of bridge No. 2066, also near Perintown. Additional authority covers the installation of a Norfolk type coal hoist, inspection pit, water tank and pump at Devon, W. Va., the junction point for the Big Sandy & Cumberland branch, now under construction between Devon and Grundy, Va.

NORTHERN PACIFIC.—A contract for the construction of grade separation structures at Twenty-second avenue, Lowry avenue and Washington street, Minneapolis, Minn., has been let to the Industrial Contracting Company, Minneapolis, at a cost of about \$250,000.

PENNSYLVANIA.—A contract amounting to \$118,000 has been awarded to Sinclair & Grigg, Philadelphia, Pa., for the construction of an undergrade bridge, together with the necessary sewers, approaches, and other incidental work in connection with the elimination of a grade crossing at Chester avenue, Swarthmore, Pa., while bids have been received for the construction of a subway, to cost approximately \$150,000, at Steubenville, Ohio.

PORT OF NEW YORK AUTHORITY.—The contract for excavation and placing of foundations for the union inland freight terminal which the Port Authority is to build on the block bounded by Eighth and Ninth avenues and Fifteenth and Sixteenth streets for the use of all railroads serving the metropolitan area, has been awarded to the Godwin Construction Company of New York. The Godwin Company's bid, \$855,000, was the lowest of seven received and calls for foundations consisting of concrete piers and walls. Clearing of the terminal site has been practically completed and actual foundation work under the new contract will begin at once, while erection of steel for the superstructure, the contract for which has not yet been awarded, will start about September 1.

ST. LOUIS-SAN FRANCISCO.—The Interstate Commerce Commission has denied this company's application for authority to build a line from Cameron, Okla., to the mine of the Tahona Smokeless Coal Company, 5.83 miles.

ST. LOUIS BOARD OF PUBLIC SERVICE.—A contract for the fabrication of the structural steel for the East St. Louis (Ill.) railroad approach to the St. Louis Municipal bridge over the Mississippi river between East St. Louis and St. Louis, Mo., has been awarded to the Mississippi Valley Structural Steel Company, Maplewood, Mo., at a cost of \$434,000. A contract for the construction of reinforced concrete foundations, abutments, piers and retaining walls for the approach, which will be about 7,000 ft. long, has been let to the Moore Brothers Construction Company, East St. Louis, at a cost of about \$325,000.

ALABAMA GREAT SOUTHERN.—*Annual Report.*—The 1930 annual report of this company shows net income, after interest and other charges, of \$2,693,446, as compared with net income of \$2,520,861 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average mileage operated	315.14	314.99	+ .05
RAILWAY OPERATING REVENUES	7,934,231	10,336,629	— 2,402,398
Maintenance of way	1,274,112	1,700,640	— 426,528
Maintenance of equipment.....	1,707,329	2,097,806	— 390,477
Transportation.....	2,599,654	2,913,024	— 313,370
TOTAL OPERATING EXPENSES...	6,158,724	7,342,307	— 1,183,583
Operating ratio	77.62	71.03	+ 6.59
NET REVENUE FROM OPERA- TIONS	1,775,507	2,994,322	— 1,218,815
Railway tax accruals	627,447	778,718	— 151,271
Hire of equip- ment	290,194	388,501	— 98,307
Joint facility rents	110,623	135,161	— 24,538
NET RAILWAY OPERATING IN- COME	1,327,268	2,468,708	— 1,141,440
Non-operating income	1,894,583	594,678	+ 1,299,905
GROSS INCOME.	3,221,851	3,063,387	+ 158,464
Rent for leased roads..	19,650	19,650	.....
Interest on funded debt..	423,840	423,840	.....
NET INCOME...	2,693,446	2,520,861	+ 172,585

Italics denote decrease.

Italics denote decrease.

BALTIMORE & OHIO.—*Acquisition of Chicago & Alton.*—The Interstate Commerce Commission has authorized the Stockholders Protective Committee of the Alton to intervene in this proceeding.

BALTIMORE & OHIO.—*Alton Stockholders Permitted to Intervene in Acquisition Case.*—The Interstate Commerce Commission has authorized the protective committee representing stockholders of the Chicago & Alton to intervene in the proceedings on the B. & O. application for authority to acquire the property.

BOSTON & MAINE.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue in temporary form, \$13,943,000 of first mortgage 4¾ per cent, series JJ bonds, maturing in 1961. The issue is authorized for sale to a syndicate headed by Kidder, Peabody & Co., at 97, which will make the annual cost to the railroad approximately 4.94 per cent.

CAROLINA, CLINCHFIELD & OHIO.—*Annual Report.*—The annual report of this company for 1930 shows net deficit, after interest and other charges, of \$462,051, as compared with net income of \$334,190 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
RAILWAY OPERATING REVENUES	6,016,063	6,783,240	—767,177
TOTAL OPERATING EXPENSES	3,998,344	4,333,573	—335,229

	1930	1929	Increase or Decrease
NET REVENUE FROM OPERATIONS	2,017,718	2,449,666	—431,948
Railway tax ac- cruals	836,000	800,000	+ 36,000
Railway operating income	1,181,468	1,649,260	—467,792
Equipment rents	765,670	1,087,910	—322,240
Joint facility rents	19,944	23,815	— 3,871
NET RAILWAY OP- ERATING INCOME.....	1,927,194	2,713,355	—786,161
Non-operating in- come	161,862	159,256	+ 2,606
GROSS INCOME.....	2,089,057	2,872,611	—783,554
TOTAL DEDUCTIONS FROM GROSS IN- COME	2,551,109	2,538,420	+ 12,689
NET INCOME	* 462,051	334,190	—796,241

* Deficit.

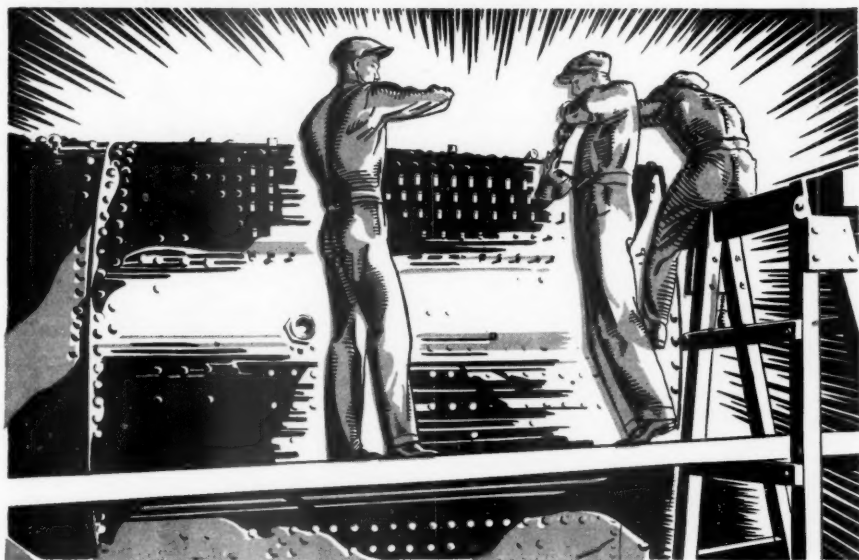
CHESAPEAKE & OHIO.—*Annual Report.*—The 1930 annual report of this company, excluding the Hocking Valley, shows net income, after interest and other charges, of \$34,144,056, as compared with net income of \$32,192,415 in 1929. Net income for both companies totaled \$33,999,455. Selected items from the Income Statement of the Chesapeake & Ohio follow:

	1930	1929	Increase or Decrease
Average mile- age operated..	3,094.4	3,077.9	+ 16.5
RAILWAY OPER- ATING REVEN- UES	131,597,052	129,779,114	+ 1,817,937
Maintenance of way....	17,845,019	18,671,233	— 826,214
Maintenance of equipment	25,532,301	29,016,912	— 3,484,611
Transporta- tion	33,366,891	32,409,582	+ 957,309
TOTAL OPERAT- ING EXPENSES	83,028,084	85,514,857	— 2,486,773
Operating ratio	63.1	65.9	— 2.8
NET REVENUE FROM OPER- ATIONS	48,568,968	44,264,257	+ 4,304,711
Railway tax accruals ...	9,799,074	8,645,354	+ 1,153,720
Railway operat- ing income..	38,760,833	35,609,546	+ 3,151,287
Equipment rents (net).	1,916,414	3,441,390	— 1,524,975
Joint facility rents (net).	1,162,569	1,169,303	— 6,733
NET RAILWAY OPERATING INCOME	39,514,678	37,881,633	+ 1,633,045
GROSS INCOME	44,585,860	41,370,150	+ 3,215,709
Rent for leased roads	56,322	131,986	— 75,664
Interest on debt	10,230,905	8,909,830	+ 1,321,075
TOTAL DEDUC- TIONS FROM GROSS INCOME	10,441,056	9,177,734	+ 1,263,322
NET INCOME..	34,144,803	32,192,415	+ 1,952,387
Disposition of net income:			
Income ap- plied to sink- ing and other reserve funds	130,448	123,143	+ 7,305
Income bal- ance trans- ferred to profit and loss	34,014,355	32,069,272	+ 1,945,082

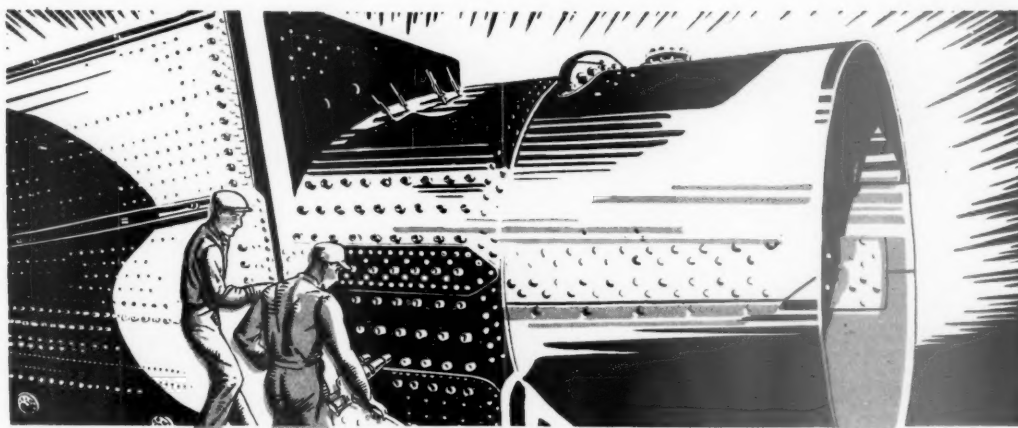
Italics denote decrease.

CHICAGO & ALTON.—*Receivership Compensations.*—An order awarding \$750,000 as fees for services during the receivership of this railroad was entered on April 2 by Federal Judge George A. Carpenter at Chicago. All of the compensations in this order, which is the final one, are in addition to previous fees granted during the nine-year receivership. Included in the fees are the following, with the

Continued on Next Left Hand Page



2 MODERN STAYBOLTS



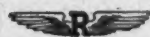
■ WITH BOILER pressures climbing constantly higher, a staybolt with higher tensile strength became necessary. Staybolts of Agathon Alloy Steel supply the greater strength while retaining the fatigue resistance required for this exacting work.

■ Where the preference for iron staybolts still exists, Republic metallurgists offer Toncan—the modern staybolt iron.

■ Toncan Iron—the alloy of refined iron, copper and molybdenum has a superior corrosion resistance and is uniform throughout, being free from all seams and slag holes. These advantages are obtained without any sacrifice of fatigue resistance. For modern staybolts, either iron or steel, consult Republic.



CENTRAL ALLOY DIVISION
REPUBLIC STEEL
 CORPORATION
 Massillon, Ohio



amounts: Silas H. Strawn, general solicitor, \$200,000; William W. Wheelock, co-receiver, \$51,500; Herbert A. Lundahl, special master in chancery, \$50,000; the law firms of Burry, Johnstone, Peters & Dixon, Chicago, \$80,000, Tayler, Blanc, Capron & Marsh, New York, \$80,000, and Patterson, Eagle, Greenough & Day, New York, \$75,000.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—Bonds.—The Interstate Commerce Commission has authorized this company to issue \$1,250,000 of first and general mortgage 6 per cent, series B, bonds to be pledged and repledged as collateral security for short term notes.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—Annual Report.—The 1930 annual report of this road shows net deficit after interest and other charges of \$90,252, as compared with net income of \$1,308,410 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average mileage operated	646.79	650.34	— 3.55
RAILWAY OPERATING REVENUES	14,725,076	18,078,393	—3,353,317
Maintenance of way	1,668,846	1,822,784	— 153,938
Maintenance of equipment	3,087,111	3,692,140	— 605,029
Transportation	5,446,329	6,319,514	— 873,185
TOTAL OPERATING EXPENSES	11,188,392	12,908,740	—1,720,348
Operating ratio	75.98	71.40	+ 4.58
NET REVENUE FROM OPERATIONS	3,536,684	5,169,652	—1,632,968
Railway tax accruals	944,181	1,075,290	— 131,109
Railway operating income	2,591,732	4,092,986	—1,501,254
Hire of freight cars—Dr.	719,431	764,694	— 45,263
Joint facility rents, net Dr.	716,817	718,753	— 1,936
NET RAILWAY OPERATING INCOME	1,138,759	2,603,563	—1,464,804
Non-operating income	232,811	130,359	+ 102,452
GROSS INCOME	1,371,571	2,733,923	—1,362,352
Rent for leased roads	37,130	40,342	— 3,212
Interest on funded debt	1,404,987	1,369,049	+ 35,938
TOTAL DEDUCTIONS FROM GROSS INCOME	1,461,823	1,425,512	+ 36,311
NET INCOME	* 90,252	1,308,410	—1,398,662

* Deficit.

DENVER & RIO GRANDE WESTERN.—Annual Report.—The 1930 annual report of this company shows net income, after interest and other charges, of \$7,068,617, as compared with net income of \$8,811,532 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average mileage operated	2,549.15	2,588.34	— 9.19
RAILWAY OPERATING REVENUES	29,747,537	34,828,668	—5,081,131
Maintenance of way	3,862,179	5,441,659	—1,579,479
Maintenance of equipment	5,577,686	6,592,013	—1,014,327
Transportation	9,179,736	10,236,514	—1,056,771
TOTAL OPERATING EXPENSES	20,693,800	24,535,166	—3,841,365
Operating ratio	69.56	70.45	— .89
NET REVENUE FROM OPERATIONS	9,053,736	10,293,502	—1,239,766

	1930	1929	Increase or Decrease
Railway tax accruals	2,170,000	2,395,000	— 225,000
Hire of equipment—Net	242,997	321,340	+ 564,338
Joint facility rents—Net	305,299	313,866	+ 8,566
NET RAILWAY OPERATING INCOME	6,940,942	8,528,676	—1,587,734
GROSS INCOME	7,239,800	8,959,900	—1,720,110
Rent for leased roads	102,194	102,194	.....
NET INCOME	7,068,617	8,811,532	—1,742,915

DETROIT & MACKINAC.—Annual Report.—The 1930 annual report of this company shows net deficit after interest and other charges of \$77,830, as compared with net income of \$85,847 in 1929. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
RAILWAY OPERATING REVENUES	1,082,774	1,586,301	—503,527
Maintenance of way	302,397	401,076	— 98,679
Maintenance of equipment	196,820	337,380	—140,560
Transportation	407,446	483,633	— 76,186
TOTAL OPERATING EXPENSES	959,900	1,274,010	—314,109
Operating ratio	88.65	80.31	+ 8.34
NET REVENUE FROM OPERATIONS	122,873	312,291	—189,418
Railway tax accruals	91,649	103,237	— 11,587
Railway operating income	31,192	208,881	—177,689
Equipment rents, net Dr.	800	16,012	— 16,812
Joint facility rents, net Dr.	2,709	5,849	— 8,559
TOTAL INCOME	42,816	254,735	—211,919
Interest on funded debt	110,000	110,000	.....
NET INCOME	* 77,830	85,847	—163,678

† Debit. * Deficit.

ELGIN, JOLIET & EASTERN.—Annual Report.—The 1930 annual report of this company shows net income, after interest and other charges, of \$1,657,993, as compared with net income in 1929 of \$960,662. Selected items from the Income Statement follow:

	1930	1929	Increase or Decrease
Average mileage operated	452.41	453.12	— .71
RAILWAY OPERATING REVENUES	21,807,616	26,412,440	—4,604,824
Maintenance of way	2,684,571	2,650,967	+ 33,604
Maintenance of equipment	3,613,327	4,337,457	— 724,130
Transportation	8,427,443	9,256,579	— 829,136
TOTAL OPERATING EXPENSES	15,573,475	17,096,232	—1,522,757
Operating ratio	71.41	64.73	+ 6.68
Railway tax accruals	1,357,449	1,484,972	— 127,522
Railway operating income	4,878,504	7,830,669	—2,954,164
Equipment and joint facility rents	1,861,440	2,378,406	— 516,965
NET RAILWAY OPERATING INCOME	3,015,063	5,452,262	—2,437,198
Non-operating income	310,264	409,264	— 98,991
GROSS INCOME	3,325,328	5,861,527	—2,536,198
Rent for leased roads	1,293,421	4,174,061	—2,880,639
Interest on funded debt	500,000	500,000	.....
NET INCOME	1,657,993	960,662	+ 693,331

KANSAS CITY SOUTHERN.—Annual Report.—The 1930 annual report of this company shows net income, after interest and other charges, of \$1,466,610, as compared

with net income of \$3,365,218 in 1929. Selected items from Income Statement are:

	1930	1929	Increase or Decrease
Average mileage operated	883.22	883.23	— .01
RAILWAY OPERATING REVENUES	19,096,693	21,978,221	—2,881,528
Maintenance of way	2,261,224	2,595,479	— 334,254
Maintenance of equipment	3,123,845	3,433,248	— 309,403
Transportation	5,703,045	6,179,335	— 476,289
TOTAL OPERATING EXPENSES	13,120,199	14,275,415	—1,155,215
Operating ratio	74.83	71.53	+ 3.30
NET REVENUE FROM OPERATIONS	5,976,494	7,702,806	—1,726,312
Railway tax accruals	1,170,082	1,446,457	— 276,375
Railway operating income	4,802,917	6,244,543	—1,441,625
Equipment rents, net Dr.	956,475	996,507	— 40,031
Joint facility rents, net Dr.	75,664	99,114	— 23,449
NET RAILWAY OPERATING INCOME	3,770,777	5,148,922	—1,378,144
Non-operating income	957,952	1,305,901	— 347,949
GROSS INCOME	5,760,870	7,550,445	—1,789,575
Rent for leased roads	172,203	171,880	+ 323
Interest on funded debt	2,731,167	2,585,319	+ 145,848
TOTAL DEDUCTIONS FROM GROSS INCOME	4,294,260	4,185,226	+ 109,034
NET INCOME	1,466,610	3,365,218	—1,898,608

LAKE DECATUR & EASTERN.—Acquisition.—William P. Bartel, director of the Bureau of Service of the Interstate Commerce Commission has recommended in a proposed report that the commission deny this company's application for authority to acquire and operate 2.41 miles of main track and 15.32 miles of side tracks in Macon county, Ill., owned by the A. E. Staley Manufacturing Company. The report showed that by operating the property as a common carrier it was proposed to obtain a greater revenue by receiving divisions of rates from connecting lines.

LOUISVILLE & NASHVILLE.—New Director.—R. W. Bingham, publisher of the Louisville (Ky.) Times and Courier-Journal, has been elected a member of the board of directors, succeeding James B. Brown, former president of the National Bank of Kentucky.

MIDDLE FORK.—Acquisition.—Examiner J. S. Pritchard of the Interstate Commerce Commission has recommended in a proposed report that the commission deny this company's application for authority to acquire and operate in common carrier service a line from Midvale, W. Va., to Cassity, 13.025 miles, built for logging purposes and now operated by Moore, Keppel & Co., a lumber company, which is said to have caused the applicant company to be organized for the purpose of obtaining divisions from connecting lines.

MISSOURI-KANSAS-TEXAS.—Acquisition of Beaver, Meade & Englewood.—The Interstate Commerce Commission has modified its authorization to this company providing for acquisition of control of the Beaver, Meade & Englewood, to permit the acquisition of \$920,700 of stock and \$911,000 of bonds at a consideration equivalent to \$22,000 per mile of line or approximately \$2,310,000 in total.

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The result is

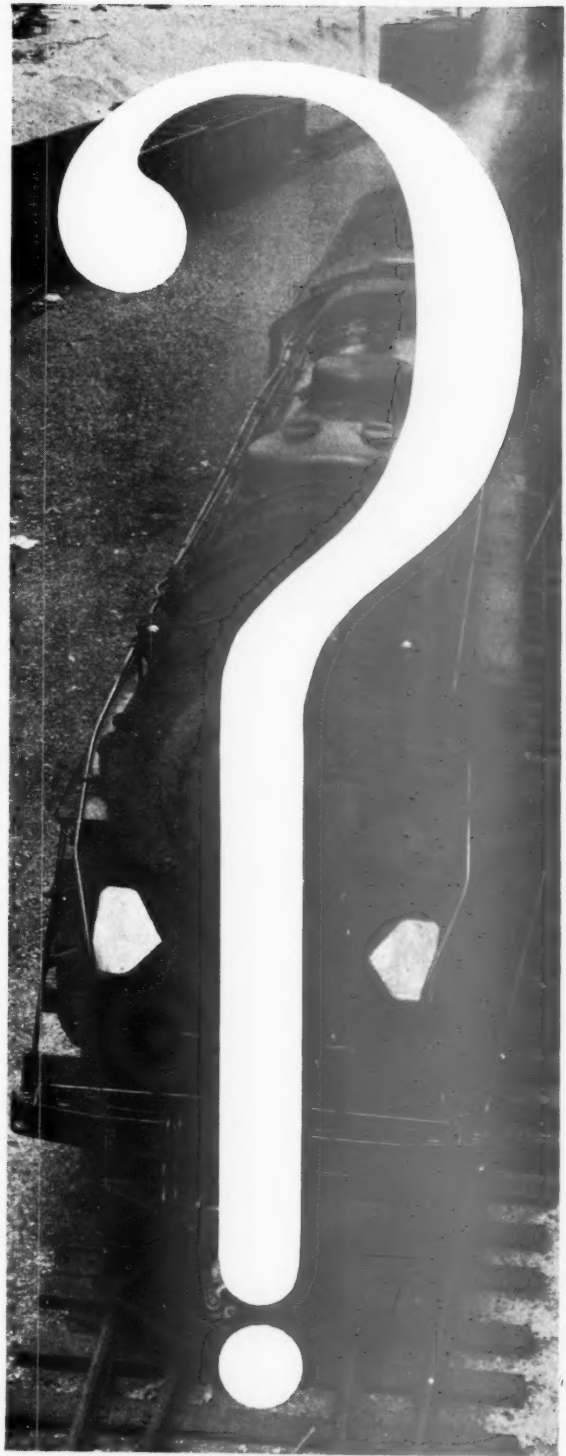
BETTER FIRES

light and thin over the entire firebox.

Firebar Corporation

CLEVELAND

OHIO



NEW YORK, NEW HAVEN & HARTFORD.—Rights to Use Terminal Property Excluded from Valuation.—The supreme court of the District of Columbia has denied this company's petition for a writ of mandamus to require the Interstate Commerce Commission to include in its valuation of the New Haven's property an amount representing the value of its rights in perpetuity to the use of property connected with the Grand Central Terminal in New York city, which the company placed at \$55,490,531; and its rights to the use of terminal property at Boston which are placed at approximately \$18,000,000. The commission held in its valuation report that to include these items in the New Haven valuation would result in duplication, because the property had been included in the New York Central report, and that the right was a commercially valuable contract for which no specific value would be reported for the purpose of ascertaining a valuation for rate-making purposes.

NEW YORK, NEW HAVEN & HARTFORD.—Annual Report.—The 1930 annual report of this company shows net income, after interest and other charges of \$15,863,791, as compared with net income of \$22,296,268 in 1929. Selected items from the Income Statement follow:

	1930	Increase or Decrease
RAILWAY OPERATING REVENUES	118,885,514	—23,573,155
Maintenance of way..	16,587,198	— 3,429,977
Maintenance of equipment	18,002,612	— 5,379,461
Transportation	38,231,103	— 5,079,348
TOTAL OPERATING EXPENSES	79,955,346	—14,163,197
Operating ratio	67.25	+ 1.19
NET REVENUE FROM OPERATIONS	38,930,167	— 9,409,957
Railway tax accruals..	6,717,488	— 1,349,461
Railway operating income	32,190,311	— 8,048,983
Hire of freight cars—		
Dr.	2,309,760	+ 209,338
NET RAILWAY OPERATING INCOME	25,084,940	— 8,546,203
Non-operating income...	6,966,685	+ 1,660,278
GROSS INCOME	32,051,626	— 6,885,925
Rent for leased roads.	2,760,956	+ 17,885
Interest on funded debt	11,937,271	— 587,984
TOTAL DEDUCTIONS FROM GROSS INCOME	16,187,835	— 453,447
NET INCOME	15,863,791	— 6,432,477

SOUTHERN PACIFIC.—Annual Meeting.—At the annual meeting of the stockholders at Anchorage, Ky., Hugh Neill, vice-president and secretary, was elected a director succeeding G. M. Thornton, resigned. A total of 41,570 stockholders were present or represented by proxy—81.3 per cent of the total. The place of annual meeting was changed to Spring Station, Woodford County, Ky.

Average Prices of Stocks and of Bonds

	Apr. 7	Last week	Last year
Average price of 20 representative railway stocks.	81.34	83.39	136.11
Average price of 20 representative railway bonds..	91.93	92.54	94.08

Dividends Declared

Anchison, Topeka & Santa Fe.—Common, \$2.50, quarterly, payable June 1 to holders of record May 1.
Pittsburgh & West Virginia.—Common, 1½ per cent, quarterly, payable April 30 to holders of record April 15.

Railway Officers

EXECUTIVE

Harold R. Cole, who has been appointed assistant to vice-president of the Erie, with headquarters at New York, has been connected with that railroad since February 1, 1897. Mr. Cole was born on December 6, 1877, at Central Valley, N. Y. His first position with the Erie was that of telegrapher, and subsequently he served as dispatcher, trainmaster, transportation inspector, and supervisor of safety; and until his recent promotion was superintendent of the Susquehanna and Tioga division.

H. C. Barlow, who has been appointed special representative of the vice-president of the Erie, with headquarters at New York, has been in the continuous service of that road since November 22, 1871. Mr. Barlow was born on June 16, 1859, at Jersey City, N. J., and received a public school education. His first position with the Erie was that of messenger boy in the local freight office at Salamanca, N. Y., and he held various positions in that office until he was appointed chief clerk in 1888. In February, 1891, he was appointed traveling freight agent, in November, 1892, division freight agent, and from July, 1894, to November, 1911, he served as freight claim agent in the freight claim department. On the latter date he was appointed freight claim adjuster; in March, 1920, he was appointed general freight claim adjuster, and in February, 1927, he became manager, freight claims, the position he held until his recent appointment.

FINANCIAL, LEGAL AND ACCOUNTING

E. J. McVann has been appointed general counsel of the Kanawha Central, with headquarters at Washington, D. C.

James M. Chaney, valuation attorney of the Missouri Pacific, has been promoted to assistant general solicitor, with headquarters as before at St. Louis, Mo.

Lowell Hastings, who has been associated with the law firm of Sanders Childs, Bobb & Westcott at Chicago, has been appointed general attorney of the Chicago & North Western, with headquarters at Chicago, succeeding **Edgar R. Hart**, deceased.

OPERATING

Carl Schiller, supervising instructor in the dining car department commissary of the Pennsylvania at Chicago, has been promoted to general supervisor of service in the dining car department of the system, a newly created position.

K. C. Marshall, superintendent of the Terminals division of the Southern Pacific Lines in Texas and Louisiana, Houston, Tex., has been appointed superintendent of terminals of the Beaumont division, with headquarters as before at Houston. The Terminals division was abolished on April 1 and its mileage added to that of the Beaumont division, of which **H. J. Micksch** is superintendent. **T. M. Spence**, assistant superintendent of the Terminals division, has been appointed assistant superintendent of the Beaumont division.

R. S. Black, assistant superintendent of the Canadian division of the Pere Marquette, has been promoted to superintendent of that division, with headquarters as before at St. Thomas, Ont. In the rearrangement of operating divisions in connection with the retirement from active service at his own request of **J. A. Anderson**, who was superintendent of the Port Huron-Grand Rapids division, with headquarters at Saginaw, Mich., **D. J. Swope**, superintendent of the Detroit-Canadian division, has been appointed superintendent of the Detroit-Grand Rapids division, with headquarters as before at Detroit, Mich.

TRAFFIC

R. R. Farmer, vice-president of the Louisiana, Arkansas & Texas, with headquarters at Greenville, Tex., has also been appointed general freight and passenger agent.

L. W. Putnam, commercial agent for the Terminal Railroad Association, at St. Louis, Mo., has been appointed general eastern agent, with headquarters at Pittsburgh, Pa.

D. C. Kennedy, assistant general freight agent of the Kanawha Central, has been promoted to general freight agent, with headquarters as before at Charleston, W. Va.

John F. Bon, assistant freight traffic manager of the Western Pacific, has been promoted to freight traffic manager, with headquarters as before at San Francisco, Cal., effective April 16.

E. J. Hoddy, agricultural agent for the Louisville & Nashville at Knoxville, Tenn., has been promoted to general development agent, with headquarters at Louisville, Ky., succeeding **Carl B. James**, deceased.

C. F. Farmer has been appointed to succeed **J. D. Marney**, retired, as assistant freight traffic manager of the Baltimore & Ohio, with headquarters at St. Louis, Mo., and **F. T. Sturtevant**, assistant general freight agent at Cleveland, Ohio, has been appointed to succeed Mr. Farmer as general freight agent in charge of perishable freight traffic, with headquarters at Baltimore, Md. **C. M. Groninger**, who has been division freight agent at Baltimore, Md., succeeds Mr. Sturtevant as assistant general freight agent at Cleveland. **J. W. Phipps**, in-



Is your road protected?

ARE you sure that every bit of steam passing through the dry pipes of your locomotives is doing full duty behind the pistons?

If the valves and cylinders are equipped with wearing parts of HUNT-SPILLER *Air Furnace* GUN IRON you do not have to worry.

But if not, it is a good plan to check up and see what you are paying to prevent those leaks which waste fuel and reduce locomotive efficiency.

Then apply a few test applications of HUNT-SPILLER *Air Furnace* GUN IRON wearing parts to the valves and cylinders of several locomotives — note how cheaply your power can be insured against power losses.

Then insure every locomotive worth operating.



HUNT-SPILLER MFG. CORPORATION
J.G. Platt, Pres. & Gen. Mgr. V.W. Ellet, Vice-President

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International Rwy. Supply Co., 30 Church Street, New York, N. Y.

HUNT-SPILLER GUN IRON

Air Furnace

dustrial agent at St. Louis, has been assigned to succeed Mr. Groninger as division freight agent at Baltimore, and **S. V. Leonard**, district freight representative, has been appointed industrial agent at St. Louis.

F. G. Lantz, who has been promoted to freight traffic manager of the lines of the Erie west of Buffalo, N. Y., and Salamanca, with headquarters at Chicago, has been connected with that road for nearly 44 years. He was born at Orange, N. J., and obtained his first railway experience as a checker in the office of the auditor of the Erie at New York in July, 1887. During the following 25 years he held various minor positions, including those of chief clerk in the claim department at Cleveland, Ohio, chief clerk to the general manager at Chicago and division freight agent at Chicago. In 1912 he was promoted to assistant general freight agent at Chicago, and during six months of 1918 he served as terminal superintendent at Chicago. Mr. Lantz was advanced to



F. G. Lantz

general freight agent at Chicago in 1920 and to assistant freight traffic manager in 1928. His promotion to freight traffic manager became effective on April 1.

Louis H. Geller, who has been promoted to general freight agent of the lines of the Erie west of Buffalo, N. Y., and Salamanca, with headquarters at Chicago, has been connected with that railroad for 42 years. He was born at Georgetown, D. C., on May 7, 1875, and obtained his first railway experience as a clerk in the office of the auditor of the Erie Despatch Fast Freight Line at New York at the age of 14 years. Mr. Geller attended public schools and Cooper Institute at New York. Until 1909, he served with the Erie Despatch as a clerk in the office of the general manager at Cleveland, Ohio, and Chicago, and with the Erie as chief clerk to the assistant general freight agent at Chicago. From 1909 until the present time, he has been successively southern freight agent for the Erie at Chicago, commercial agent, division freight agent and general freight agent for the Erie, the Erie Despatch and the Union Steam-

boat Line at Cleveland, and assistant general freight agent of the Erie at the latter point. His promotion to general freight agent at Chicago, in charge of rates and divisions became effective on April 1.

Henry W. Forward, who retired from active duty on April 1 as freight traffic manager of the lines of the Erie west of Buffalo, N. Y., and Salamanca, has been in railway service for 55 years, and all of that time with the Erie and its predecessor companies. He was born at Somerset, Pa., on August 8, 1859, and attended the public schools at Cincinnati, Ohio. At the age of 16 years he obtained his first railway experience as an office boy on the Atlantic & Great Western. Later he served as chief clerk in the general freight office of the New



Henry W. Forward

York, Pennsylvania & Ohio at Cleveland, Ohio, and as division freight agent on the Chicago & Erie at Chicago. He was promoted to assistant general freight agent of the Erie at Chicago in 1896, to general freight agent in 1908, to assistant freight traffic manager in 1927, and to freight traffic manager in 1928. In connection with his retirement from active service Mr. Forward has been appointed consulting traffic officer of the Erie at Chicago.

G. G. Early, assistant freight traffic manager of the Wabash, has been promoted to freight traffic manager, in charge of the rate department, with headquarters as before at St. Louis, Mo. Mr. Early has been engaged in railway service for 31 years, obtaining his first experience as a clerk on the Erie. He was born at Pittsburgh, Pa., on July 25, 1881. His early railroad service included various clerical positions on the Erie and that of chief rate clerk of the Wabash lines east of Toledo, Ohio, and comprising the West Side Belt and the Wabash-Pittsburgh Terminal. In 1917 he was promoted to general freight and passenger agent of the Pittsburgh & West Virginia at Pittsburgh, Pa., and in the following year he became assistant general freight agent of that railroad. In 1920 he reopened an off-line agency of the Wabash at Philadelphia,

Pa., which had been closed during Federal control of the railroads, where he remained until 1921, when he was appointed assistant general freight agent at St.



G. G. Early

Louis. Mr. Early was advanced to general freight agent at St. Louis in 1924, to assistant freight traffic manager in 1927 and to freight traffic manager in charge of the rate department on April 1, 1931.

Jesse P. Patterson, freight traffic manager of the New York Central at Chicago, has been promoted to traffic manager in charge of freight traffic on the lines west of Buffalo, N. Y., and Clearfield, Pa., with headquarters at the same point. Mr. Patterson was born at St. Catharines, Ont., and has been connected with the New York Central for nearly 24 years. He obtained his first rail-



Jesse P. Patterson

road experience as a general clerk on the New York Central at Buffalo, later serving successively as chief clerk in the division freight offices at Buffalo and Erie, Pa., and in the office of the freight traffic manager and as division freight agent at Toledo, Ohio. In 1925 he was advanced to assistant to the traffic manager at New York, where he remained until January, 1927, when he was promoted to assistant freight traffic man-

ager, with headquarters at Chicago. Mr. Patterson was further promoted to freight traffic manager at Chicago in November, 1927, his promotion to traffic manager of the western lines becoming effective on April 1.

ENGINEERING AND SIGNALING

G. R. Smiley, chief engineer of construction of the Louisville & Nashville, has been appointed assistant chief engineer, with headquarters as before at Louisville, Ky.

D. W. Dower, signal supervisor on the Southern Pacific at Los Angeles, Cal., has been promoted to assistant signal engineer, with headquarters at San Francisco, Cal.

MECHANICAL

John A. Turtle, master mechanic on the Union Pacific at Denver, Colo., since 1903, retired from active duty on April 1 after more than 50 years in the service of the mechanical department of that railroad.

PURCHASES AND STORES

J. E. Wenzel, storekeeper of the Fort Dodge, Des Moines & Southern, has been promoted to purchasing agent, with headquarters as before at Boone, Iowa.

H. J. Vance, purchasing agent of the Chicago & Illinois Valley, with headquarters at Granite City, Ill., has been appointed chief purchasing officer of the Illinois Terminal System, with headquarters at Chicago.

Clyde L. Wakeman, who has been appointed general storekeeper of the Wabash, with headquarters at St. Louis, Mo., has been engaged in railway storekeeping service for more than 20 years. He was born at Springview, Neb., on November 8, 1891, and after going to high school attended college for one year. He obtained his first railway experience during the summers of 1908 and 1909 as a trucker and foreman in charge

of shop delivery in the stores department of the St. Louis-San Francisco at Springfield, Mo. Later he served as a yard clerk on the Frisco at Kansas City, Mo., and as a store clerk and general clerk in the division store and chief clerk to the division storekeeper on the Union Pacific at Kansas City, Kan. From October, 1913, to October, 1914, Mr. Wakeman was an accountant in the office of



Clyde L. Wakeman

the superintendent and in the stores department of the Union Pacific at Kansas City. He was then appointed storekeeper in the material and store yard at Junction City, Kan. From June, 1916, to August, 1917, he served successively as assistant storekeeper and general foreman of the material yard at Topeka, Kan., and as general foreman and storekeeper of the division store at Kansas City, Kan. During the remainder of 1917, and in 1918 and 1919 he was engaged in military service, from which he was discharged in July, 1919, as a captain of the One-Hundred and Tenth United States Engineers. He then returned to the Union Pacific as division storekeeper at Green River, Wyo., where he remained until December, 1920, when he was appointed chief clerk to the general storekeeper of the Union Pacific at Omaha. Mr. Wakeman's appointment as general storekeeper of the Wabash became effective on March 23, 1931.

MOTOR TRANSPORT

M. McKinstry has been appointed assistant to the president, in addition to his duties as secretary and treasurer of the Pacific Greyhound Lines, Inc., Pacific Greyhound Lines of Texas, Inc., and California Parlor Car Tours Company. **L. G. Markel** has been appointed traffic manager, succeeding **H. A. Wooster**, resigned, and **C. J. Sundberg** has been appointed assistant traffic manager. All will have headquarters at San Francisco, Cal.

SPECIAL

A. H. Devenish has been appointed assistant general manager of hotels, western lines, Canadian Pacific, with headquarters at Winnipeg, Man.

John F. Rector, formerly manager of the advertising department of the Missouri Pacific Lines, has been appointed publicity director of the Missouri-Kansas-Texas Lines, with headquarters at St. Louis, Mo.

OBITUARY

John F. Phelan, trainmaster on the Chicago, Burlington & Quincy at Sheridan, Wyo., died on April 1.

Adolph Yappen, assistant engineer of bridge maintenance on the Chicago, Milwaukee, St. Paul & Pacific at Chicago, died in that city on April 4.

E. P. Turner, general passenger and ticket agent of the Texas & Pacific, with headquarters at Dallas, Tex., from 1897 to 1911, died in that city on March 28 at the age of 75 years.

J. A. Morris, district manager of the Car Service division of the American Railway Association at Cincinnati, Ohio, died in that city on April 6. Mr. Morris was a former superintendent of terminals of the Cleveland, Cincinnati, Chicago & St. Louis at Cincinnati and had been president of the Cincinnati division of the American Association of Railroad Superintendents.

Annual Reports

Central of Georgia Railway Company

Report of the Board of Directors

To the Stockholders of Central of Georgia Railway Company:

The Board of Directors submits the following report of the operations and affairs of Central of Georgia Railway Company for the year ended December 31, 1930:

Income

A summary of the income for the year ended December 31, 1930, as compared with the previous year is shown in Table 2.

Railway Operating Revenues

"Railway Operating Revenues" amounted to \$21,082,429.22 this year, as compared with \$25,033,991.69 last year, a decrease of \$3,951,562.47, or 15.78 per cent. For details of "Railway Operating Revenues" see Table 2.

"Freight Revenue" decreased \$2,772,036.28, or 14.54 per cent. Tons of revenue freight carried one mile were 1,360,631,144, a decrease of 231,711,776, or 14.55 per cent, compared with last year. The average rate per ton mile was 1.20 cents, the same as previous year. The decrease in freight revenue was due to

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the general business depression, and to truck competition.

"Passenger Revenue" decreased \$705,737.91, or 20.57 per cent. The number of passengers carried one mile was 87,988,163, a decrease of 22,933,770, or 20.68 per cent, compared with last year. The average revenue per passenger mile increased 0.01 cents, or 0.32 per cent. The decrease in passenger business revenue was due to the increasing use of private automobiles and busses, and to the general business depression.

"Mail Revenue" decreased \$681.32, or 0.11 per cent.

"Express Revenue" decreased \$291,856.58, or 32.49 per cent, due to decrease in volume of express transported.

There was an increase of \$2,338.51, or 3.40 per cent, in other passenger train revenue, consisting of "Excess Baggage," "Milk" and "Other Passenger Train Revenue."

"Switching" and "Special Service Train Revenue" decreased \$53,051.32, or 14.97 per cent.

"Incidental" and "Joint Facility Revenues" decreased \$130,537.57, or 20.96 per cent.

Railway Operating Expenses

"Railway Operating Expenses" amounted to \$16,123,140.37 this year, as compared with \$19,134,801.93 last year, a decrease of \$3,011,661.56, or 15.74 per cent. For details of "Railway Operating Expenses" see Table 2.

"Maintenance of Way and Structures Expenses" decreased \$1,189,332.83, or 35.17 per cent. Of this amount \$337,706.68 was due to decrease in extraordinary expenditures incurred in the previous year because of washing out of tracks caused by excessive rainfall. The remainder, \$851,626.15, was due mainly to reductions because of decrease in business.

"Maintenance of Equipment Expenses" decreased \$893,146.66, or 20.31 per cent, due mainly to reductions because of decreased business. Charges to "Maintenance of Equipment" for depreciation were \$928,565.48, an increase of \$27,850.07. This increase was due to the purchase of 550 new freight train cars. The average miles per serviceable locomotive were 32,409, a decrease of 85 miles, or 0.26 per cent, compared with the previous year. The average age of locomotives was 21.2 years, compared with 20.2 years for the previous year.

"Traffic Expenses" decreased \$28,308.88, or 3.35 per cent.

"Transportation Expenses" decreased \$828,576.82, or 8.88 per cent, due to reductions because of decrease in business.

"Miscellaneous Operations" decreased \$9,298.71, or 5.94 per cent, due mainly to decrease in dining car service in through trains.

"General Expenses" decreased \$56,728.11, or 5.45 per cent, due to reductions because of decreased business.

"Transportation for Investment—Credit" increased \$6,269.55, or 30.56 per cent.

Railway Tax Accruals

"Railway Tax Accruals" amounted to \$1,322,862.72 this year, compared with \$1,530,394.31 last year, a decrease of \$207,531.59, or 13.56 per cent. Federal income taxes decreased \$231,988.51. This was offset in part by an increase of \$24,456.92 in State, County, and Municipal taxes.

Uncollectible Railway Revenues

"Uncollectible Railway Revenues" were \$8,163.00 this year, compared with \$9,067.78 last year, a decrease of \$904.78.

Equipment Rents—Net Credit

"Equipment Rents—Net Credit" amounted to \$191,382.77 this year, as compared with \$275,236.64 last year, a decrease of \$83,853.87, or 30.47 per cent.

Joint Facility Rents

"Joint Facility Rents—Net Debit" was \$150,834.81 this year, as compared with \$126,507.72 last year, an increase of \$24,327.09, or 19.23 per cent.

Non-Operating Income

"Non-Operating Income" amounted to \$1,344,079.03 this year, as compared with \$909,285.02 last year, an increase of \$434,794.01. The increase was due to the following: "Income from Lease of Road" decreased \$371.79; "Miscellaneous Rent Income" increased \$5,441.59; "Income from Miscellaneous Non-Operating Physical Property" increased \$6,885.64; "Dividend Income" increased \$54,794.69, due to increase in dividends from Louisville and Wadley Railroad Company of \$4,056.00, from Wrightsville and Tennille Railroad Company of \$8,400.00, from Albany Passenger Terminal Company of \$285.00, and from Atlantic Compress Company of \$42,053.69; "Income from Funded Securities" increased \$379,997.89, due mainly to increase of \$390,432.62 in interest received from "Advances to Affiliated Companies," decrease of \$10,000 in interest received from Bowdon Railway, and decrease of \$434.73 from "Miscellaneous";

"Income from Unfunded Securities and Accounts" decreased \$11,688.82; Interest received from demand deposits decreased \$17,672.26; while interest on bank balances, interest during construction, and miscellaneous increased \$5,983.44.

Deductions from Gross Income

"Deductions from Gross Income" amounted to \$3,605,125.76 this year, as compared with \$3,659,697.60 last year, a decrease of \$54,571.84. The decrease was due to the following: "Rent for Leased Roads" decreased \$710.82; "Miscellaneous Rents" decreased \$6,071.42, chiefly in rental of "Vale Royal Terminals"; "Miscellaneous Tax Accruals" increased \$306.31; "Interest on Funded Debt" decreased \$29,631.37, as follows: Interest on equipment trusts decreased \$34,966.93, while interest on mortgage bonds increased \$5,335.56; "Interest on Unfunded Debt" increased \$20,392.61, due mainly to note issued to Pullman Car and Manufacturing Corporation for new freight equipment. Other items of decreases were "Amortization of Discount on Funded Debt," \$13,622.66, and "Miscellaneous Income Charges," \$3,607.47.

Additions and Betterments

There were expended during the year for "Additions and Betterments" (including improvements on lessor properties) \$1,203,206.34. The following is a classified statement of these expenditures:

Road:	
Engineering	\$ Cr. 2,884.76
Land for transportation purposes	1,937.20
Grading	13,434.28
Bridges, trestles, and culverts	100,638.34
Ties	10,600.87
Rails	26,429.09
Other track material	115,408.73
Ballast	3,810.39
Track laying and surfacing	12,510.39
Right-of-way fences	1,807.68
Crossings and signs	23,975.31
Station and office buildings	34,099.33
Roadway buildings	Cr. 459.62
Water Stations	Cr. 861.88
Shops and enginehouses	Cr. 22,126.73
Storage warehouses	11,543.15
Telegraph and telephone lines	901.67
Signals and interlockers	6,117.56
Power distribution systems	2,139.62
Power line poles and fixtures	245.62
Miscellaneous structures	47,679.47
Paving	266.79
Roadway Machines	26,836.81
Assessments for public improvements	Cr. 335.62
Shop machinery	46,455.09
Power plant machinery	Cr. 9,000.00
Total	\$ 451,168.78
Equipment:	
Steam locomotives	\$ 29,735.56
Freight-train cars	997,273.92
Passenger-train cars	Cr. 1,860.16
Work equipment	26,644.25
Miscellaneous equipment	2,464.00
Total	\$ 1,054,257.57
Less equipment retired	Cr. 302,220.01
Net	\$ 752,037.56
Grand Total	\$ 1,203,206.34

General Remarks

The attached tables exhibit the financial condition of your Company and the result of the year's transactions.

Under the Company's pension plan, W. C. Askew, Treasurer, retired November 1, 1930, after long and faithful service extending over a period of more than forty-nine years.

Effective November 1, 1930, Charles F. Groves, Secretary, was elected to fill the offices of both Secretary and Treasurer.

The Board of Directors takes pleasure in expressing its appreciation to officers and employees for their loyal and efficient service.

By order of the Board of Directors,

LAWRENCE A. DOWNS,
Chairman of the Board.

Table 2—Income Statement for the Years Ended December 31st, 1930 and 1929

	1930	Per cent of Total Operating Revenues	1929	Per cent of Total Operating Revenues	+Increase or —Decrease
Average miles operated	1,944.40	....	1,944.57	....	— .17
Railway Operating Revenues:					
Rail-Line Transportation:					
Freight	\$16,288,837.93	77.26	\$19,060,874.21	76.14	—\$2,772,036.28
Passenger	2,725,868.21	12.93	3,431,606.12	13.71	— 705,737.91
Excess baggage	17,950.77	.09	22,210.81	.09	— 4,260.04
Mail	596,830.72	2.83	597,512.04	2.38	— 681.32
Express	606,337.70	2.88	898,194.28	3.59	— 291,856.58
Milk	9,115.52	.04	6,859.87	.03	+ 2,255.65

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	1930	Per cent of Total Operating Revenues	1929	Per cent of Total Operating Revenues	+ Increase or — Decrease
Other passenger-train ...	43,999.95	.21	39,657.05	.16 +	4,342.90
Switching ...	293,975.78	1.39	336,802.60	1.34 —	42,826.82
Special service train	7,275.25	.04	17,499.75	.07 —	10,224.50
Total rail-line transportation revenue	\$20,590,191.83	97.67	\$24,411,216.73	97.51	—\$3,821,024.90
Incidental Operating Revenue:					
Dining and buffet	\$112,584.91	.53	\$127,051.42	.51 —	\$14,466.51
Hotel and restaurant ...	3,746.04	.02	4,240.38	.02 —	494.34
Station, train, and boat privileges ..	7,752.24	.04	11,502.26	.05 —	3,750.02
Parcel room ..	59.10	..	78.40	.. —	19.30
Storage — freight	74,240.56	.35	87,415.26	.35 —	13,174.70
Storage — baggage	381.90	..	549.44	.. —	167.54
Demurrage ..	37,108.68	.18	65,859.30	.26 —	28,750.62
Power	2,363.13	.01	5,233.21	.02 —	2,870.08
Rents of buildings and other property ...	5,271.76	.03	3,644.59	.01 +	1,627.17
Miscellaneous	202,699.44	.96	267,678.05	1.07 —	64,978.61
Total incidental operating revenue	\$ 446,207.76	2.12	\$ 573,252.31	2.29	—\$ 127,044.55
Joint Facility Operating Revenue:					
Joint facility —Cr.	\$ 46,816.25	.21	\$ 50,796.73	.20 —	\$ 3,980.48
Joint facility —Dr.	786.62	....	1,274.08	.... —	487.46
Total joint facility operating revenue	\$ 46,029.63	.21	\$ 49,522.65	.20 —	\$ 3,493.02
Total railway operating revenues ..	\$21,082,429.22	100.00	\$25,033,991.69	100.00	—\$3,951,562.47
Railway Operating Expenses:					
Maintenance of way and structures ...	\$ 2,192,546.29	10.40	\$ 3,381,879.12	13.51	—\$1,189,332.83
Maintenance of equipment ..	3,504,784.32	16.63	4,397,930.98	17.57	— 893,146.66
Traffic	816,472.39	3.87	844,781.27	3.37	— 28,308.88
Transportation — rail line ..	8,505,210.55	40.34	9,333,787.37	37.28	— 828,576.82
Miscellaneous operations ..	147,199.55	.70	156,498.26	.63 —	9,298.71
General	983,714.98	4.67	1,040,443.09	4.16 —	56,728.11
Transportation for investment—Cr. ..	26,787.71	.13	20,518.16	.08 +	\$ 6,269.55
Total railway operating expenses ..	\$16,123,140.37	76.48	\$19,134,801.93	76.44	—\$3,011,661.56
Net revenue from railway operations	\$ 4,959,288.85	23.52	\$ 5,899,189.76	23.56	—\$ 939,900.91
Railway tax accruals	\$ 1,322,862.72	6.27	\$ 1,530,394.31	6.11	—\$ 207,531.59
Uncollectible railway revenues	8,163.00	.04	9,067.78	.04 —	904.78
Railway operating income ..	\$ 3,628,263.13	17.21	\$ 4,359,727.67	17.41	—\$ 731,464.54

	1930	Per cent of Total Operating Revenues	1929	Per cent of Total Operating Revenues	+ Increase or — Decrease
Additions to Railway Operating Income:					
Hire of freight cars — credit balance \$	228,247.87	....	\$ 341,830.40	....	— \$ 113,582.53
Rent from locomotives .	21,585.73	....	21,631.52	....	— 45.79
Rent from pas- senger - train cars	152,250.95	....	138,524.87	....	+ 13,726.08
Rent from work equip- ment	8,718.76	....	9,451.58	....	— 732.82
Joint facility rent income.	120,316.32	....	149,170.22	....	— 28,853.90
Total addi- tions to rail- way operat- ing income. \$	531,119.63	....	\$ 660,608.59	....	— \$ 129,483.96
Deductions from Railway Operating Income:					
Rent for loco- motives \$	13,343.96	....	\$ 12,924.21	....	+ \$ 419.75
Rent for pas- senger-train cars	203,854.10	....	218,822.55	....	— \$ 14,968.45
Rent for work equipment . .	2,222.48	....	4,454.97	....	— 2,232.49
Joint facility rent—Deduc- tions	271,151.13	....	275,677.94	....	— 4,526.81
Total deduc- tions from railway operating in- come \$	490,571.67	....	\$ 511,879.67	....	— \$ 21,308.00
Net railway operating in- come — car- ried forward \$	3,668,811.09	....	\$ 4,508,456.59	....	— \$ 839,645.50

	1930	1929	+ Increase or — Decrease
Net railway operating income— brought forward	\$3,668,811.09	\$4,508,456.59	—\$839,645.50
Non-Operating Income:			
Income from lease of road....	\$ 52,955.88	\$ 53,327.67	—\$ 371.79
Miscellaneous rent income....	123,927.13	118,485.54	+ 5,441.59
Miscellaneous non-operating physical property.....	36,152.96	29,267.32	+ 6,885.64
Dividend income	543,728.69	488,934.00	+ 54,794.69
Income from funded securities	523,432.83	143,434.94	+ 379,997.89
Income from unfunded securi- ties and accounts.....	43,826.51	55,515.33	— 11,688.82
Income from sinking and other reserve funds	20,055.03	20,320.22	— 265.19
Total non-operating income..	\$1,344,079.03	\$ 909,285.02	+ \$434,794.01
Gross income	\$5,012,890.12	\$5,417,741.61	—\$404,851.49
Deductions from Gross Income:			
Rent for leased roads.....	\$ 343,790.87	\$ 344,501.69	—\$ 710.82
Miscellaneous rents—Deductions	146,451.94	152,523.36	— 6,071.42
Miscellaneous tax accruals....	4,546.56	4,240.25	+ 306.31
Interest on funded debt.....	2,971,178.75	3,000,810.12	— 29,631.37
Interest on nonnegotiable debt to affiliated companies....	46,250.00	67,877.02	— 21,627.02
Interest on unfunded debt....	24,111.18	3,718.57	+ 20,392.61
Amortization of discount on funded debt	53,391.46	67,014.12	— 13,622.56
Miscellaneous income charges.	15,405.00	19,012.47	— 3,607.47
Total deductions from gross income	\$3,605,125.76	\$3,659,697.60	—\$ 54,571.84
Income balance transferred to credit of Profit and Loss..	\$1,407,764.36	\$1,758,044.01	—\$350,279.65

Delaware, Lackawanna & Western Railroad Company

New York, April 1st, 1931.

TO THE STOCKHOLDERS OF
THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD
COMPANY:

A detailed report of the results from the operation of the property of your Company for the calendar year 1930, including statistical comparisons with the previous year and statements of property changes involving added capital expenditures, is herewith respectfully submitted.

The reduction in gross transportation revenues of your Company resulted mainly from the nation-wide business depression which prevailed throughout the entire year.

The stagnation of business activity extended to practically

all branches of industry, and the scarcity of traffic available for transportation made 1930 one of the lightest traffic years in the history of your railroad when consideration is given to its present capacity for service provided through added capital expenditures in recent years for modern facilities and equipment.

Revenues from transportation of anthracite coal decreased 14% and revenues from other freight decreased 17% in the year 1930 compared with the previous year.

Revenues from transportation of passengers decreased 10.4%. While the loss from this class of traffic doubtless was augmented by the general economic disturbance, the decline has been progressively greater from year to year, due to the ever increasing use of private automobiles and the competition

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of bus lines operating over highly developed highways, paralleling your railroad, and at rates that would be confiscatory were they obliged to provide and maintain a private right of way or pay the approximate equivalent in taxes.

The adverse conditions affecting railroad earnings, generally, applied with even greater force to the Railway Express business, and as a result your Company's earnings on business handled for the Railway Express Agency were approximately 25% less than in the previous year.

Revenues from Milk transportation increased \$33,359 over revenues from this source in the previous year. This is especially noteworthy, because, with one exception, it is the only major item of traffic which showed an increase; the other item was vehicular traffic over the ferries.

The results from other transportation and incidental sources for the year, although less than in the preceding year, were fairly satisfactory.

Operating Expenses

The total operating expenses for the year 1930 amounted to \$52,612,853, a decrease of \$5,107,058, compared with the operating expenses of the previous year.

A statement of the foregoing by primary accounts showing increases and decreases in comparison with like expenses of the preceding year is included on pages 17 to 20 of this report.

The important items of maintenance and operating costs are subjected to further comparison and comment as follows:

A comparative statement, by years, of rail tonnages by weight sections laid in replacement and tons of rock ballast applied, is as follows:

Year	Tonnage 130 lbs. to Yard	Tonnage 118 lbs. to Yard	Tonnage 105 lbs. to Yard	Tonnage 80 lbs. to Yard	Total Tonnage All Weights	Total Tonnage Rock Ballast
1920	.....	.....	16,297	2,944	19,241	117,676
1921	.....	.....	19,572	1,283	20,855	178,733
1922	.....	.....	11,604	1,245	12,849	134,133
1923	.....	.....	14,199	2,308	16,507	71,661
1924	.....	9,515	6,232	620	16,367	135,542
1925	7,378	4,501	880	36	12,795	114,088
1926	13,541	26	3,634	723	17,924	145,857
1927	13,623	44	3,298	400	17,365	145,820
1928	15,398	7	5,113	5	20,523	71,802
1929	16,134	.....	1,931	869	18,934	116,040
1930	10,870	.....	2,904	50	13,824	89,230

The comparative reduction in cost of roadway maintenance was due in part to the increased use of mechanical labor-saving devices in the operation of ballast cleaning, tamping, etc. There was a substantial decrease in the cost of repairs and renewals of bridges and culverts, due to the fact that no extraordinary repairs were required, and only ordinary maintenance expenses were incurred for this class of property. There were laid in replacement 195,636 chemically treated and 190 untreated cross ties, or 3,113 less than in the preceding year.

Maintenance of Equipment

The cost of repairs and renewals of rolling stock and floating equipment amounted to \$12,879,781, a decrease of \$1,400,673, compared with the previous year.

Substantial reductions were accomplished in the cost of maintaining all classes of equipment, but the comparative decreases are in a measure due to reduced use of equipment account of decreased traffic. No deferred maintenance was permitted to accrue and, at the close of the year under consideration, the equipment was well maintained and in good, serviceable condition.

The policy, previously established, of retiring units of equipment showing evidence of obsolescence or inadequacy, rather than to incur unwarranted expenses for repairs, was continued throughout 1930 and resulted in the retirement from service of 43 steam locomotives, 1,751 freight train cars, 41 passenger train cars and 74 company service cars.

Transportation Expenses

The cost of performing transportation service was \$28,602,066, a decrease of \$3,038,558, compared with the previous year.

The decrease in transportation costs was mainly due to the large reduction in tonnage available for movement during the year, but a considerable saving was effected by the elimination, wherever possible, of expense not strictly essential to properly conduct the transportation business of your Company.

Revenue freight shipments amounted to 25,512,937 tons, a decrease of 3,393,331 tons, compared with the previous year, and the revenue freight train mileage required to handle the tonnage was 5,320,355, a decrease of 836,686 miles.

There were 26,665,498 passengers carried, or 914,918 less than in the previous year.

The comparative reduction in cost of fuel for yard and road locomotives, amounting to approximately 15%, is explained by the reduced mileage performance of locomotives.

Payments for loss and damage to freight in transit during the year were \$12,403 less than in the previous year, and the ratio of loss and damage payments to freight revenues was .67% as compared with .58% in 1929.

Payments for injuries to persons were \$14,690 less than in the previous year.

Agriculture

Farm production in territories served by your railroad averaged about 85% of normal for all crops. The reduced crop yield must be attributed to prolonged periods of drought extending with more or less severity over all sections.

Owing to the general business let-down, 1930 prices for farm products in general were lower than in the preceding year but this disadvantage was in part compensated for by a corresponding reduction in the prices of some of the necessities which farmers were obliged to purchase.

Dairying is the principal agricultural pursuit of farmers served by your railroad and, while large quantities of milk were produced and shipped by them, the prices realized were generally less favorable than during the year 1929, and there is at present a large surplus of fluid milk which must be converted into by-products, the market value of which promises to be less remunerative to the farmer than if disposed of in its original form.

Notwithstanding adverse weather conditions, the potato crop in certain sections was much larger than expected, a number of farmers obtaining yields of upwards of 300 bushels per acre. The quality was also very good, but the prices realized were low, notwithstanding the fact that the production of potatoes for the entire country was less than in 1929.

A large acreage of peas and lettuce was cultivated in 1930, and the product was of high quality, but prices realized were low, owing to the general depression. Shipments of this class of farm products were about equal in quantity to those of the preceding year.

The trained Agriculturist employed by your Company continues to give his entire time to the farmers served by your railroad and is constantly available to individuals or communities for consultation and advice on all matters relating to crop rotation and the most suitable methods of soil fertilization and cultivation.

Financial

An issue of Bangor and Portland Railway 1st Mortgage 6% bonds, amounting to \$150,000 par value, fell due January 1st, 1930. The payment of the interest and principal of these bonds was assumed by your Company upon the merger of the Bangor and Portland Railway Company with the Delaware, Lackawanna and Western Railroad Company, July 1st, 1909, and, prior to the maturity date, \$101,400 in par value had been purchased and held in the treasury; the balance, amounting to \$48,600 par value, were purchased at maturity, thus retiring the issue.

In order to finance the cost of constructing the new Freight Terminal and Warehouse in Jersey City and the electrification of a portion of the New Jersey suburban lines, including new equipment, your Company sold in February, 1930, treasury assets consisting of \$10,000,000 par value of Morris and Essex Railroad Company Construction Mortgage 5% bonds, Series A of 1955, and \$15,000,000 par value of Morris and Essex Railroad Company Construction Mortgage 4½% bonds, Series B of 1955, with a net cash realization from both issues of \$24,262,500.

The temporary bank loan negotiated at the close of the year 1929, and of which specific mention was made in the annual report for that year, was reduced from \$6,000,000 to \$4,500,000 during the year 1930.

Welfare Expenditures

The pension system was inaugurated June 1st, 1902, and a comparative statement of disbursements for account thereof, by calendar years, is as follows:

Calendar Year	Amount	Calendar Year	Amount	Calendar Year	Amount
1902	\$6,360.94	1911	\$85,092.24	1921	\$213,625.49
1903	16,202.85	1912	93,521.50	1922	223,587.23
1904	24,619.09	1913	103,607.95	1923	245,071.48
1905	31,681.05	1914	111,089.68	1924	260,213.20
1906	45,196.13	1915	122,828.46	1925	302,040.85
1907	51,412.95	1916	134,969.98	1926	347,161.36
1908	57,620.24	1917	154,009.42	1927	369,641.42
1909	71,322.42	1918	153,577.12	1928	401,543.04
1910	80,580.15	1919	160,958.05	1929	447,995.51
		1920	187,299.98	1930	499,609.64

\$5,002,439.42

Number of pensioned employees on rolls December 31, 1930	690
Number of employees pensioned June 1st, 1902 to Dec. 31st, 1930	1,883

[ADVERTISEMENT]

Number of employees granted pensions during 1930....	123
Number of pensioned employees removed by death during 1930.....	73
Greatest length of service.....	68 years 8 months
Number of pensioners who served 50 years and over....	99
Number of pensioners who served between 40 and 50 years.....	289
Number of pensioners who served between 25 and 40 years.....	292
Number of pensioners who served less than 25 years....	10
Average number of years in employ of Company.....	40 years 5 months
Average age at retirement.....	67 years 4 months
Average age at present time.....	72 yrs. 11 months

Group Insurance

Pursuant to the Group Insurance Plan authorized and made effective February 1st, 1922, your Company paid as its proportion of the premiums assessed for the year 1930, \$177,213.79.

A statement of the number of beneficiaries and the amount of insurance carried at the close of the year, together with other important details, follows:

Number of insured December 31, 1930.....	16,343
Total insurance, December 31, 1930.....	\$32,560,500
Deaths during the year 1930.....	181
Permanent disability claims, year 1930.....	37
Insurance Company paid account of death claims during 1930.....	\$352,500
Insurance Company paid account of disability claims during 1930.....	\$71,625
Premiums paid by employees.....	\$278,308.34
Premiums paid by Company.....	\$177,213.79
Number of death claims, February 1, 1922 to December 31, 1930.....	1,460
Number paid permanent disability benefits.....	139
Amount paid account of death claims, February 1, 1922 to December 31, 1930.....	\$2,822,500
Amount paid account of permanent disability claims.....	\$275,625

In addition to the foregoing expenditures, your Company paid as its proportion of the 1930 deficit from the operation of the Moses Taylor Hospital, of Scranton, Penn., \$38,644.88, and contributed toward the running expenses of Railroad Y. M. C. A.'s located at various terminals, \$27,046.02.

Taxes

Tax assessments during the past sixteen years are indicated by the following:

Calendar Year	Total Tax Assessments	Taxes per Dollar of Gross Revenue	Taxes per Dollar of Revenue after Operating Expenses
1915	\$2,115,333.84	4.72	12.42
1916	2,517,882.68	4.88	12.82
1917	3,584,917.49	6.27	18.35
1918	3,922,872.54	5.71	20.85
1919	5,159,802.72	7.18	32.74
1920	4,539,785.14	5.45	47.79
1921	4,939,439.57	5.80	28.01
1922	4,894,466.10	6.56	44.72
1923	5,995,697.51	6.80	32.02
1924	6,900,101.85	7.96	31.02
1925	6,832,652.72	8.17	32.16
1926	7,671,403.68	8.64	29.03
1927	7,457,093.11	8.81	30.43
1928	6,392,638.37	7.88	27.60
1929	6,635,895.83	8.12	27.62
1930	6,081,111.71	8.73	35.67

There was an increase in the Federal Income Tax rate from 11% in 1929 to 12% in 1930, but owing to the reduction in earnings the requirement was approximately \$900,000 less than in the previous year.

The State and local tax assessments in New Jersey for the year were increased \$239,500, and the local tax assessments in New York State increased \$87,240. State tax assessments in Pennsylvania and New York were approximately the same as in the preceding year.

Additions and Betterments

Charges to the Investment Account, for Road and Equipment of your Company and its leased lines, less credits for property retired from service during the year, were \$17,765,388.07.

The projects worthy of special mention because of their magnitude and importance, completed during the year or actively in process of construction at the close thereof, are as follows:

ELECTRIFICATION—Authorized in 1928 and commenced in 1929, and of which a description was given in the last annual report, was actively carried on during the year 1930 and at the close thereof was nearing completion. The operation of electric trains was commenced on completed portions of the project between Hoboken and Montclair, N. J., September 3rd, 1930; between Hoboken and South Orange, N. J., September 22nd, 1930; between Hoboken and Morristown, N. J., December 18th, 1930, and the movement of freight trains by electric locomotive power between Hoboken and the Secaucus Yards was commenced October 5th, 1930. The remaining sections embraced in the Electrification project, viz., Morristown to Dover and Summit to Gladstone, were practically completed at the close of the year and electric trains will be installed thereon in January, 1931. The total cost of the Electrification project to December 31, 1930, excluding rolling stock, was \$11,411,876, and the cost of new rolling stock, including cost of additions and betterments to rolling stock formerly used in steam operation, incident to outfitting it for electric operation, was \$5,534,158.

The rolling stock, consisting of 141 new all steel motor equipped passenger cars and 141 all steel passenger cars converted into multiple unit trailers, were all delivered and available for service, and the five substations, located at Bergen Junction (west end of tunnels), Roseville Avenue (Newark), Summit, Denville and Bernardsville, as well as the overhead structure for supporting the power transmission wires and cables, were fully completed, and the stringing of the wires and cables, replacement and adjustment of signals, etc., were nearing completion at the close of the year.

NEW FREIGHT TERMINAL AND WAREHOUSE, JERSEY CITY, N. J., the construction of which was commenced in 1929, and a

The Delaware, Lackawanna and Western Railroad Company Income Account for the Years Ended December 31st, 1930 and 1929

	1930	1929	+ Increase or — Decrease
REVENUES:			
From Transportation of Anth. Coal.....	\$17,368,261.54	\$20,183,020.86	— \$2,814,759.32
From Transportation of Merchandise.....	33,418,200.45	40,303,156.35	— 6,884,955.90
From Transportation of Passengers.....	10,115,126.34	11,285,364.36	— 1,170,238.02
From Transportation of Mail.....	1,030,538.84	1,596,593.30	— 566,054.46
From Transportation of Express.....	1,279,750.99	1,701,295.77	— 421,544.78
From Transportation of Milk.....	2,316,142.58	2,282,783.65	+ 33,358.93
Other Revenue from Transportation.....	2,778,347.27	2,960,242.92	— 181,895.65
Incidental Revenue.....	1,355,122.25	1,430,764.76	— 75,642.51
Total Revenues.....	\$69,661,490.26	\$81,743,221.97	— \$12,081,731.71
EXPENSES:			
For Maintenance of Way and Structures.....	\$6,788,470.07	\$7,656,284.22	— \$867,814.15
For Maintenance of Equipment.....	12,879,781.29	14,280,454.61	— 1,400,673.32
For Traffic Expenses.....	1,715,242.23	1,709,034.98	+ 6,207.25
For Transportation Expenses.....	28,602,065.74	31,640,623.26	— 3,038,557.52
For Miscellaneous Operations.....	569,548.88	625,902.19	— 56,353.31
For General Expenses.....	2,124,843.04	2,129,073.32	— 4,230.28
For Transportation for Investment—Cr.	67,098.59	321,462.40	— 254,363.81
Total Expenses 75.53%	\$52,612,852.66	\$57,719,910.18	— \$5,107,057.52
Net Revenue from Operation.....	\$17,048,637.60	\$24,023,311.79	— \$6,974,674.19
Less Railway Tax Accruals.....	6,081,111.71	6,635,895.83	— 554,784.12
Less Uncollectible Railway Revenues.....	4,128.38	10,655.68	— 6,527.30
Railway Operating Income.....	\$10,963,397.51	\$17,376,760.28	— \$6,413,362.77
Equipment Rents—Net Cr.	72,226.55	5,909.05	+ 66,317.50
Joint Facility Rents—Net Cr.	124,299.15	125,917.85	— 1,618.70
Net Railway Operating Income.....	\$11,159,923.21	\$17,508,587.18	— \$6,348,663.97
NON-OPERATING INCOME:			
Income from Lease of Road.....	\$4,516.80	\$4,305.22	+ \$211.58
Miscellaneous Rent Income.....	283,740.24	310,903.83	— 27,163.59
Miscellaneous Non-Operating Physical Property.....	122,361.97	112,809.71	+ 9,552.26
Dividend Income.....	526,526.37	565,058.87	— 38,532.50
Income from Funded Securities.....	1,290,795.37	1,606,634.87	— 315,839.50
Income from Unfunded Securities and Accounts.....	455,148.88	365,863.61	+ 89,285.27
Income from Sinking and Other Reserve Funds.....	6,095.00	6,095.00	—
Miscellaneous Income.....	12,649.48	36,920.87	— 49,570.35
Total Non-Operating Income.....	\$2,676,535.15	\$3,008,591.98	— \$332,056.83
Gross Income.....	\$13,836,458.36	\$20,517,179.16	— \$6,680,720.80
DEDUCTIONS FROM GROSS INCOME:			
Rent for Leased Roads.....	\$7,663,517.45	\$7,070,278.71	+ \$593,238.74
Interest on Funded Debt.....	2,640.00	5,832.84	— 3,192.84
Interest on Unfunded Debt.....	87,726.04	100,937.47	— 13,211.43
Total Deductions from Gross Income.....	\$7,753,883.49	\$7,177,049.02	+ \$576,834.47
Net Income.....	\$6,082,574.87	\$13,340,130.14	— \$7,257,555.27

description of which appeared in the annual report for that year, was completed and placed in operation on June 1st, 1930.

Equipment

The new equipment authorized in 1929 but undelivered at the close of that year was all received and placed in service this year.

Other new equipment was ordered and delivered this year as follows:

- 25 All Steel 70-ton capacity Gondola cars, delivered in October and November;
- 1 All Steel 70-ton capacity Drop Center flat car for use in transporting, to and from repair points, transformers and other heavy electrical machinery used in substations, delivered in December.

In addition to the foregoing, 9 of the 1100 class road freight locomotives were reconstructed in the Company's shops, and

GENERAL BALANCE SHEET, DECEMBER 31st, 1930 and 1929

ASSETS				LIABILITIES			
	1930	1929	Increase or Decrease		1930	1929	Increase or Decrease
INVESTMENTS:				CAPITAL STOCK:			
Investment in Road and Equipment				Common Stock	\$87,407,500.00	\$87,407,500.00	
Road	\$54,143,593.75	\$51,580,420.48	\$2,563,173.27	Less held by Company	2,966,300.00	2,966,300.00	
Equipment	71,240,964.86	62,684,492.35	8,556,472.51				
Improvements on Leased Railway Property	16,405,013.49	16,579,339.13	174,325.64	Premium on Capital Stock	\$84,441,200.00	\$84,441,200.00	
Miscellaneous Physical Property	2,267,946.39	2,551,489.52	283,543.13		70,720.00	70,720.00	
Investment in Affiliated Companies:				Total Stock	\$84,511,920.00	\$84,511,920.00	
Stocks	9,485,081.37	9,484,081.37	1,000.00	LONG TERM DEBT:			
Bonds	3,355,624.50	3,177,382.75	178,241.75	Funded Debt Unmatured	\$170,000.00	\$320,000.00	\$150,000.00
Notes	3,772,964.42	3,772,964.42		Less held by Company	126,000.00	227,400.00	101,400.00
Advances	3,006,717.08	2,667,579.27	339,137.81				
Other Investments:				Non-Negotiable Debt to Affiliated Companies	\$44,000.00	\$92,600.00	48,600.00
Stocks	1,252,607.75	1,252,607.75			262,834.35	266,128.62	3,294.27
Bonds	15,490,180.70	41,225,230.70	25,735,050.00	Total Long Term Debt	\$306,834.35	\$358,728.62	
Notes	634,272.11	669,592.11	35,320.00	CURRENT LIABILITIES:			
Advances	21,381,261.37	14,963,292.26	6,417,969.11	Loans and Bills Payable	\$4,500,000.00	\$6,000,000.00	1,500,000.00
Total Investments	\$202,436,227.79	\$210,608,472.11		Traffic and Car Service			
CURRENT ASSETS:				Balances Payable	1,582,040.21	1,792,459.74	210,419.53
Cash	\$3,163,259.04	\$4,847,912.08	1,684,653.04	Audited Accounts and Wages Payable	3,747,429.98	5,677,462.25	1,930,032.27
Loans and Bills Receivable	479.23	149.23	330.00	Miscellaneous Accounts Payable	6,966.68	8,809.41	1,842.73
Traffic and Car Service				Interest Matured Unpaid	1,350.00	2,808.00	1,458.00
Balances Receivable	1,006,277.59	1,312,819.04	306,541.45	Dividends Matured Unpaid	36,892.00	29,116.00	7,776.00
Net Balances Receivable from Agents and Conductors	700,604.22	812,855.14	112,250.92	Unmatured Dividends Declared	2,533,236.00	4,222,060.00	1,688,824.00
Miscellaneous Accounts Receivable	1,321,440.23	1,607,846.99	286,406.76	Unmatured Rents Accrued	1,636,868.94	1,429,950.81	206,918.13
Materials and Supplies	2,466,457.81	2,915,538.09	449,080.28	Other Current Liabilities	145,121.43	152,636.25	7,514.82
Total Current Assets	\$8,658,518.12	\$11,497,120.57		Total Current Liabilities	\$14,189,905.24	\$19,315,302.46	
DEFERRED ASSETS:				DEFERRED LIABILITIES:			
Working Fund Advances	\$30,688.54	\$30,059.92	628.62	Other Deferred Liabilities	\$4,250.78	\$7,801.26	3,550.48
Insurance and Other Funds	151,659.00	151,659.00		UNADJUSTED CREDITS:			
Total Deferred Assets	\$182,347.54	\$181,718.92		Tax Liability	\$1,633,393.00	\$2,455,199.06	821,806.06
UNADJUSTED DEBITS:				Insurance and Casualty			
Rents and Insurance Premiums Paid in Advance	\$605,760.80	\$607,257.22	1,496.42	Reserves	635,647.96	649,217.31	13,569.35
Other Unadjusted Debits	948,830.32	744,641.28	204,189.04	Operating Reserves	25,365.23	25,782.36	417.13
Total Unadjusted Debits	\$1,554,591.12	\$1,351,898.50		Accrued Depreciation—Equipment	35,154,970.87	34,363,170.34	791,800.53
Grand Total	\$212,831,684.57	\$223,639,210.10	\$10,807,525.53	Other Unadjusted Credits	717,741.01	1,412,682.85	694,941.84

Figures in italics indicate decrease

alterations made therein to convert same into a type suitable for yard drilling service.

Other projects that were either completed or upon which substantial expenditures were made during the year are as follows:

1. Addition of embankment protection, near Nay Aug Tunnel, Scranton, Pa.;
2. Excavating of additional rock from roofs of East and West bound Nay Aug tunnels, to provide sufficient overhead clearance for a width of twelve feet to permit of the handling of large shipments, Scranton, Pa.;
3. Completing additional and improved facilities for handling Anthracite Coal and miscellaneous freight at freight terminal located at 25th St., South Brooklyn, N. Y.;
4. Additional team tracks and facilities for handling automobiles and strengthening and enlarging catenary system, at Wallabout Terminal, Brooklyn, N. Y.;
5. Addition of pneumatic tools, section motor cars and ballast cleaning machines to effect economy in maintenance;
6. One-half of the cost of 2 drydocks and appurtenances installed at West Brighton, Ship Repair Yard, N. Y.;
7. Conversion of mechanical interlocking plant to 110-volt electro-pneumatic alternating current interlocking machine with switch and lock movements at East End, Summit, N. J.;
8. Additions to Bridge No. 143.19 over Susquehanna River, Pittston, Pa., by encasing stone masonry of Pier No. 4 with reinforced concrete; renewal of superstructure of Bridge No. 21.57, carrying side track over Passaic Avenue, New Providence, N. J.; providing additional side clearance and necessary renewals to Bridge No. 236.19, Wilawanna, Pa., and Bridges numbers 230.51 and 230.57, Waverly, N. Y.; addition of cover plates and replacement of stringers, floor beams and laterals with heavier members on various bridges in New York State, to provide for the handling of heavier equipment.

Industrial tracks were laid at Kingsland, Bloomfield, Kenvil, Gladstone and Oxford Furnace, N. J.; Bloomsburg, Scranton, Clarks Summit and Belfast Junction, Pa.; and Buffalo, Johnson City, Norwich, Richfield Springs and Jamesville, N. Y.

The location of 41 new industries at various points served by the railroad, was effected during the year.

Grade Crossings

The following grade crossings were eliminated:

1 at West Winfield, N. Y. (Burrows Street); 2 east of Avoca, N. Y.; 1 at Elmira, N. Y. (East Water Street); 1 at Chadwick, N. Y. (Willowvale Crossing), and 2 at Lyons, N. J. The grade crossing eliminations at East Corners, N. Y. (Big Flats-Gibson County Highway); Cheektowaga, N. Y. (Indian Road, Broadway, Williamsville Road and School House Road),

Profit and Loss Account for the Year Ended December 31st, 1930

To Dividends (12% per annum)	\$10,132,944.00
" Net Discount on sale of M. & E. R. R. Constn. Mtge. Bonds of 1955	737,500.00
" Sundry Adjustments	42,674.17
" Balance to Credit: December General Balance Sheet	68,952,421.41
	\$79,865,539.58
By Balance Brought Forward from December 31st, 1929	\$73,782,964.71
" Net Income for Year ended December 31st, 1930	6,082,574.87
	\$79,865,539.58

and the Black Rock, N. Y., crossings where some 33,000 feet of yard tracks are being raised an average of 4½ feet, involving 75,000 cubic yards of fill, were still in process of construction at the close of the year.

As the heavy commitments for capital expenditures authorized in 1929 were either completed or approaching completion at the close of the year 1930, the carry over to the year 1931 is comparatively small. Further requirements for capital purposes in 1931 will be confined to ordinary additions and betterments incidental to replacements, and such grade crossing work as may be ordered by the highway regulatory authorities of New York, Pennsylvania and New Jersey.

The management wishes to again express to the stockholders its appreciation of their valuable assistance and cooperation in the procurement of competitive traffic for their company and to the shippers and travelers who have favored the company with their patronage during the past year.

The loyal and efficient service rendered by officers and employees of the company during the past year, is appreciated by the management and hereby duly acknowledged.

By order of the Board of Managers.

J. M. DAVIS,
President.